MOTOROLA

MAXAR®

High Performance Two-Way FM Radio

450-512 MHz

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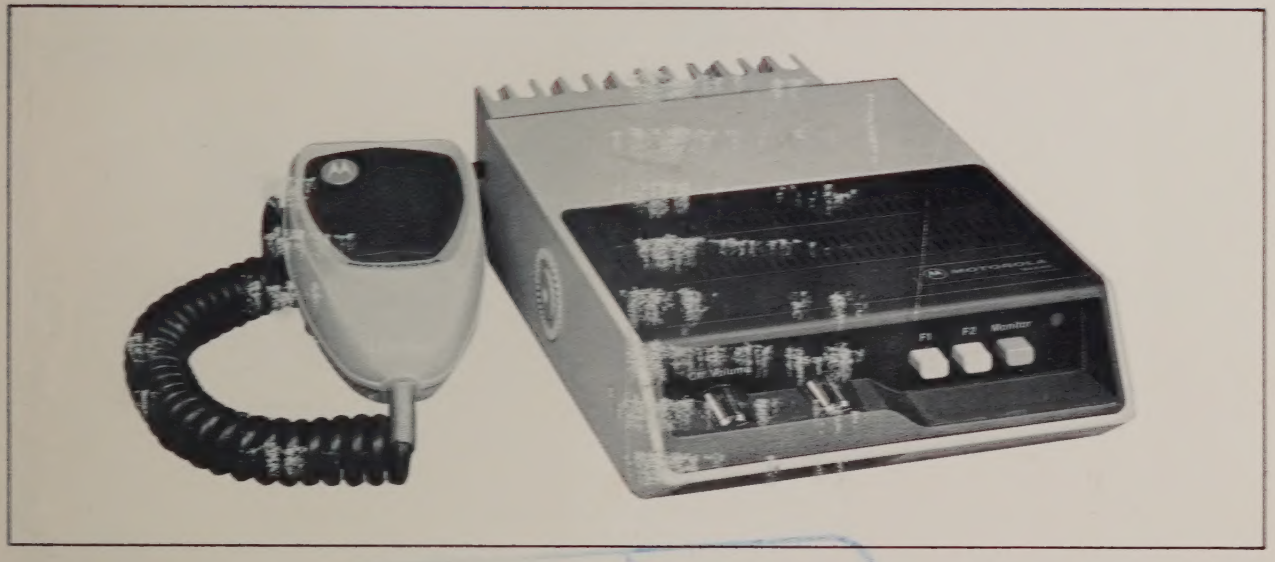

NATIONAL
ISSUED BY:
MOTOROLA
COMMUNICATIONS
TECHNICAL TRAINING DEPT.
SERVICE

Instruction Manual

68P81034E10-O

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AVAILABLE BACKGROUND REFERENCE PUBLICATIONS

Three reference publications are available to provide background information needed to service some of the newer Motorola products more effectively. The information in these publications is not duplicated in our instruction manuals. To obtain your free copy, check the ones you want and return this self–mailer to us. (NOTE: One copy of each publication has already been distributed to Motorola Service Shops (MSS's) and field technical representatives (FTR's).

First Fold

First Fold

Check item desired:

☐ **Basic Logic Circuit Guide** 68P81105E88

Describes the basic logic circuits used in Motorola Communications digital equip–ment and the logic notational scheme used in our instruction manuals.

68P81028E93–C

☐ **"Digital Private–Line" Binary–Coded Squelch** 68P81106E83

Contains fundamentals of "Digital Private–Line" system operation, circuit operation and servicing techniques.

☐ **Safe Handling of CMOS Integrated Circuit Devices** 68P81106E84

Describes special handling techniques needed to prevent irrepairable damage from static charges encountered with normal handling of CMOS devices.

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USER QUESTIONNAIRE

To the User of This Instruction Manual:

Motorola is engaged in a continuous program of improving its instruction literature. We believe that you can aid us in this program, so that we in turn can better help you service our equipment. To foster these aims, would you please answer the following questions:

First Fold

SCHEMATIC DIAGRAMS AND CABLING DIAGRAMS

First Fold

1. ☐ Are accurate and easy to follow
2. ☐ Contain minor errors
3. ☐ Contain major errors
4. ☐ Are difficult to follow

If you have checked any box except 1, please tell us what schematic diagrams, or portions thereof, were at fault, or enter other comments.*

_____

_____

68P85901D80—J

TEXT

1. ☐ Easy to follow – helps to service equipment
2. ☐ Would like more information on*

Second Fold _____ Second Fold

_____

3. ☐ Some instruction sections are too long or superfluous such as*

_____

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4. ☐ Other comments*

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(continued on reverse side)

PARTS LIST

1. ☐ Are complete and accurate
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ILLUSTRATIONS IN GENERAL

1. ☐ Are complete and accurate
2. ☐ Want more illustrations such as*

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3. ☐ Some are superfluous such as*

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The name of my instruction manual is:

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***Whenever possible, give complete model No. of equipment, and part No. of diagram or part No. of instruction section. This information is important.**

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High Performance Two-Way FM Radio

450-512 MHz

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MOTOROLA INC.
Communications Division

service publications
1301 E. Algonquin Road, Schaumburg, IL 60196

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68P81034E10-O
3/18/77-VG

DIAGRAMS & PARTS LISTS

B227 Option 68P81035E04
TRN5992A Locking Trunnion 68P81108E55
TPN 1154A Base Station Power Supply Schematic Diagram,
Circuit Board Detail, & Parts List 68P81034E86
Main Circuit Board Detail ..... 68P81034E83 (sheet 1 of 4)
Receiver Schematic Diagram ..... 68P81034E83 (sheet 2 of 4)
Radio Set Parts Lists ..... 68P81034E83 (sheet 3 of 4)
Exciter Schematic Diagram ..... 68P81034E83 (sheet 4 of 4)
Power Amplifier, Harmonic Filter, and Antenna Switch Schematic Diagram and
Circuit Board Detail and Parts List 68P81034E87
TRN6177B Tone "Private-Line" Encoder-Decoder
Schematic Diagram and Circuit Board Detail 68P81029E99
TMN1008A & TMN1009A Desk Microphone Schematic Diagram,
Circuit Board Detail, & Parts List 68P81030E06
TRN6207A "Digital Private-Line" Encoder/Decoder
Schematic Diagram & Circuit Board Detail and
Parts List 68P81030E07

SPECIFICATIONS

GENERAL

MAXIMUM BATTERY DRAIN at 13.6 V	TRANSMIT	RECEIVE	STANDBY (SQUELCHED)
	9.2A	1 A	0.3 A

FREQUENCY RANGE	450-512 MHz
DIMENSIONS	2-1/4" H x 6-1/2" W x 10-1/2" D (57mm x 165mm x 267mm)
WEIGHT	5.3 lbs. (2407g)

TRANSMITTER

RF POWER OUTPUT	30 Watts (450-470 MHZ), 25 Watts (470-512 MHZ)
SPURIOUS & HARMONIC EMMISSIONS*	70 dB below carrier
OUTPUT IMPEDANCE	50 ohms
FREQUENCY STABILITY	%0.0005%; 30°C to + 60°C (+25°C reference) ±0.0002% (Optional base only)
MODULATION	16F3
AUDIO SENSITIVITY	160mV ±3 dB for 3.0 kHz deviation at 1000 Hz
FM HUM & NOISE	-70 dB below ±3.0 kHz deviation at 1000 Hz
AUDIO RESPONSE	+1, -3 dB from 6 dB/octave pre-emphasis (300 to 3000 Hz)
AUDIO DISTORTION	Less than 3%

*Per EIA specification RS-152B, paragraph 4.

RECEIVER

CHANNEL SPACING	25 kHz
SELECTIVITY - EIA SINAD	-85 dB at ±25 kHz
INTERMODULATION - EIA SINAD	-80 dB
EIA MODULATION ACCEPTANCE	±6.5 kHz
SENSITIVITY	0.40 uV or less for 20 dB quieting. 0.3 uV or less for 12 dB sinad.
FREQUENCY STABILITY	±0.0005%; -30°C to +60°C (+25°C reference)
SPURIOUS & IMAGE REJECTION	Greater than 100 dB
SQUELCH THRESHOLD SENSITIVITY	Less than 0.2 uV
AUDIO OUTPUT	3 watts, with less than 5% distortion
AUDIO RESPONSE	+2, -8 dB from 6 dB/octave de- emphasis (300-3000 Hz)

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

FCC TRANSMITTER LICENSE DESIGNATIONS

Freq. Range (MHz)	Freq. Stability (%)	Single Frequency	Two Frequency
450-470	.0005	CC4256	CC4257
	.0002	CC4256(C)	CC4257(C)
470-494	.0005	CC4256-1	CC4257-1
	.0002	CC4256-1(C)	CC4257-1(C)
494-512	.0005	CC4256-2	CC4257-2
	.0002	CC4256-2(C)	CC4257-2(C)

FCC RECEIVER CERTIFICATION NUMBERS
Single Frequency: RC0122
Two Frequency: RC0123

SAFETY INFORMATION

The United States Department of Labor, through the provisions of the Occupational Safety and Health Act of 1970 (OSHA), has established an electromagnetic radiation safety standard which applies to any two-way mobile radio equipment. Normal use of this radio will result in exposures far below the OSHA limit. There are no reported incidents of physical damage resulting from the use of this type of radio. However, the following precautions are recommended.

DO NOT operate the transmitter when someone outside the vehicle is within two feet of the mobile antenna.

DO NOT operate the transmitter near unshielded electrical blasting caps or in an explosive atmosphere.

FOREWORD

1. SCOPE OF MANUAL

This manual is intended for use by experienced technicians familiar with similar types of equipment. It contains all service information required for the equipment described and is current as of the printing date. Changes which occur after the printing date are incorporated by Instruction Manual Revisions (SMR). These SMR's are added to the manuals as the engineering changes are incorporated into the equipment.

2. MODEL AND KIT IDENTIFICATION

Motorola equipments are specifically identified by an overall model number on the nameplate. In most cases, assemblies and kits which make up the equipment also have kit model numbers stamped on them. When a production or engineering change is incorporated, revision suffix numerals are added to the affected kit model number. For example, a TLN4448A becomes a TLN4448A-1 with the first revision, TLN4448A-2 with the second revision, etc.

As diagrams are updated, information about the change is incorporated into a revision column. This revision column appears in the manual next to the parts list or, in some cases, on the diagram. It lists the reference number, part number, and description of the parts removed or replaced when the suffix number changed. With this information, the technician can find the information for the current version, and any previous version, of the equipment covered by the manual.

3. SERVICE

Motorola's National Service Organization offers one of the finest nation-wide installation and maintenance programs available to communication equipment users. This organization includes approximately 800 authorized Motorola Service Stations (MSS) located throughout the United States, each manned by one or more trained, FCC licensed technicians.

These MSS's are independently owned and operated and were selected by Motorola to service its customers. Motorola maintenance is available on either a time and material basis or on a periodic fixed-fee type arrangement.

The administrative staff of this organization consists of national, area and district service managers and district representatives, all of whom are Motorola employees with the objective to improve the service to our customers.

Should you wish to purchase a service contract for your Motorola equipment, contact your Motorola Service Representative, or write to:

National Service Manager
Motorola Communications Division
1303 E. Algonquin Road
Schaumburg, Illinois 60196

4. REPLACEMENT PARTS ORDERING

Motorola maintains a number of parts offices strategically-located throughout the United States. These facilities are staffed to process parts orders, identify part numbers, and otherwise assist in the maintenance and repair of Motorola Communications Division products.

Orders for all parts *except* crystals, channel elements, and "Vibrasender" ® and "Vibrasponder" ® resonant reeds should be sent to the nearest area parts center. Orders for instruction manuals should also be sent to the area parts center.

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

Orders for crystals, channel elements, active filters, code plugs, and reeds should be sent directly to the factory address listed on the following page. Crystal and channel element orders should specify the crystal or channel element type number, crystal and carrier frequency, and the chassis model number in which the part is used.

Orders for active filters, code plugs, "Vibrasender" and "Vibrasponder" resonant reeds should specify type number and frequency, and should identify the owner/operator of the communications system in which these items are to be used.

5. ADDRESSES

5.1 GENERAL OFFICES

MOTOROLA, INC.
Communications Group Parts Dept.
1313 E. Algonquin Rd.,
Schaumburg, Illinois 60196
Phone: 312-576-6521
Executive Offices: 1303 E. Algonquin Rd.,
Schaumburg, Illinois 60196

5.2 U.S. ORDERS

WESTERN AREA PARTS
1170 Chess Drive, Foster City,
San Mateo, California 94404
Phone: 415-349-3111
TWX: 910-375-3877

MIDWEST AREA PARTS
10 W. North Ave.,
Lombard, Ill. 60148
Phone: 312-620-3000
TWX: 910-693-1592

MID-ATLANTIC AREA PARTS
6701 Elkridge Landing Road,
Linthicum, Maryland 21090
Phone: 301-796-8600

EAST CENTRAL AREA PARTS
12995 Snow Road,
Parma, Ohio 44130
Phone: 216-267-2210
TWX: 810-421-8845

EASTERN AREA PARTS
85 Harristown Road,
Glen Rock, New Jersey 07452
Phone: 201-447-4000
TWX: 710-988-5602

PACIFIC SOUTHWESTERN AREA PARTS
2333 Utah Avenue,
El Segundo, California 90245
Phone: 213-644-1101
TWX: 910-348-6278

SOUTHWESTERN AREA PARTS
3320 Belt Line Road,
Dallas, Texas 75234
Phone: 214-241-2151
TWX: 910-860-5505

SOUTHEASTERN AREA PARTS
5096 Panola
Industrial Blvd.
Decatur, Georgia 30032
Phone: 504-981-9800
TWX: 810-751-8300

5.3 CANADIAN ORDERS

CANADIAN MOTOROLA ELECTRONICS COMPANY
Parts Department
3125 Steeles Avenue,
East Willowdale, Ontario
Phone: 516-499-1441
TWX: 610-492-2713
Telex: 02-29944LD

5.4 ALL COUNTRIES EXCEPT U.S. AND CANADA

MOTOROLA, INC. OR MOTOROLA AMERICAS, INC.
International Parts Dept.
1313 E. Algonquin Road
Schaumburg, Illinois 60196 U.S.A.
Phone: 312-576-6492
TWX: 910-693-1592 or 1599
Telex: 722443 or 722424
Cable: MOTOL

5.5 FACTORY ADDRESS FOR CRYSTAL, CHANNEL ELEMENT, ACTIVE FILTER, CODE PLUGS AND RESONANT REED ORDERS

AIR MAIL ORDERS
Motorola, Inc.
Component Products Sales & Service
P.O. Box 66191
O'Hare International Airport
Chicago, Ill. 60666

REGULAR MAIL ORDERS AND CORRESPONDENCE
Motorola, Inc.
Component Products Sales & Service
2553 N. Edgington Street
Franklin Park, Illinois 60131

MOTOROLA

MODEL CHART

FOR

"MAXAR"

FM TWO-WAY RADIO

450-512 MHz

30/25 W RF POWER

+12 V DC MOBILE

117 V AC BASE STATION

CODE:

- [X] = ONE ITEM SUPPLIED WITH EACH RADIO
- [/] = ONE ITEM SUPPLIED WITH EACH RADIO, DEPENDENT UPON FREQUENCY
- [O] = ONE ITEM SUPPLIED FOR 10 OR LESS RADIO SETS
- [2] = NUMBER INDICATES QUANTITY SUPPLIED WITH EACH RADIO, DEPENDENT UPON FREQUENCY
- [*] = OPTIONAL ANTENNA. THE ANTENNA USED WITH THE RADIO SET DETERMINES EFFECTIVE RADIATED POWER (ERP)

ITEM	DESCRIPTION	MODEL NUMBER	NUMBER OF OPERATING FREQUENCIES	SQUELCH	RF POWER
		MOBILE MODELS			
		D34TRA-1000AK	1	CARRIER	15 W
		D34TRA-1300AK	2	CARRIER	15 W
		D34TRA-3000AK	1	"PRIVATE-LINE"	15 W
		D34TRA-3300AK	2	"PRIVATE-LINE"	15 W
		D34TRA-6000AK	1	"DIGITAL PRIVATE-LINE"	15 W
		D34TRA-6300AK	2	"DIGITAL PRIVATE-LINE"	15 W
		BASE STATION MODELS			
		L44TRB-1100AM	1	CARRIER	15 W
		L44TRB-1130AM	2	CARRIER	15 W
		L44TRB-3100AM	1	"PRIVATE-LINE"	15 W
		L44TRB-3130AM	2	"PRIVATE-LINE"	15 W
		L44TRB-6100AM	1	"DIGITAL PRIVATE-LINE"	15 W
		L44TRB-6130AM	2	"DIGITAL PRIVATE-LINE"	15 W
		PAGING BASE STATION MODELS (SEE NOTE)			
		L44TRB-1105AM	1	CARRIER	15 W
		L44TRB-1135AM	2	CARRIER	15 W
		L44TRB-3105AM	1	"PRIVATE-LINE"	15 W
		L44TRB-3135AM	2	"PRIVATE-LINE"	15 W
		L44TRB-6105AM	1	"DIGITAL PRIVATE-LINE"	15 W
		L44TRB-6135AM	2	"DIGITAL PRIVATE-LINE"	15 W
TUE1433AB	UNIFIED CHASSIS (450-470 MHz); 1-FREQ., 30/25 W	/			
TUE1434AB	UNIFIED CHASSIS (470-490 MHz); 1-FREQ., 30/25 W	/			
TUE1435AB	UNIFIED CHASSIS (494-512 MHz); 1-FREQ., 30/25 W	/			
TUE1433AH	UNIFIED CHASSIS (450-470)MHz); 2-FREQ., 30/25 W	/			
TUE1434AH	UNIFIED CHASSIS (470-494 MHz); 2-FREQ., 30/25 W	/			
TUE1435AH	UNIFIED CHASSIS (494-512 MHz); 2-FREQ., 30/25 W	/			
TRN6206A	HARDWARE FOR 2-FREQ., CARRIER SQUELCH	X			
TRN6204A	HARDWARE FOR 1-FREQ., "PRIVATE-LINE"	X			
TRN6205A	HARDWARE FOR 2-FREQ., "PRIVATE-LINE"	X			
TRN6607A	"DIGITAL PRIVATE-LINE" ENCODER/DECODER BOARD	X			
TRN6005A	CODE PLUG	X			
TRN6177B	"PL" ENCODER/DECODER BOARD	X			
KLN6209A	"VIBRASPONDER" RESONANT REED	X			
THN6244A	HOUSING	X			
TRN6211A	ESCUTCHEON FOR 1-FREQ., CARRIER SQUELCH	X			
TRN6212A	ESCUTCHEON FOR 2-FREQ., CARRIER SQUELCH	X			
TRN6213A	ESCUTCHEON FOR 1-FREQ., "PRIVATE-LINE	X			
TRN6214A	ESCUTCHEON FOR 2-FREQ., "PRIVATE-LINE"	X			
TRN6215A	ESCUTCHEON FOR 1-FREQ., "DIGITAL PRIVATE-LINE"	X			
TRN6216A	ESCUTCHEON FOR 2-FREQ., "DIGITAL PRIVATE-LINE"	X			
TPN1154A	AC POWER SUPPLY	X			
TRN6223A	BASE TRAY	X			
TKN6917A	POWER CABLE	X			
TRN6209A	MOBILE INSTALLATION KIT	X			
TAE6052A	ANT ROOF-TOP (450-470 MHz)	/			
TAE6054A	ANT ROOF-TOP (470-512 MHz)	/			
TAE6074A	ANTENNA, 470-494 MHz (3.5 dB GAIN)	*			
TAE6075A	ANTENNA, 494-512 MHz (3.5 dB GAIN)	*			
TAE6094B	ANTENNA, 470-494 MHz (5 dB GAIN)	*			
TAE6095B	ANTENNA, 494-512 MHz (5 dB GAIN)	*			
RXN6121AA	CRYSTAL, XMTR (Y100, Y160)	2			
RXN6122AA	CRYSTAL, RCVR (Y10, Y11)	2			
TRN6210A	TUNING TOOL	O			
TMN6104A	MICROPHONE	X			
TLN4839A	MICROPHONE HANG-UP KIT	X			
TRN6283A	"PL" MICROPHONE HANG-UP KIT	X			
TMN1008A	"PL" DESK MICROPHONE	X			
TMN1009A	CARRIER SQUELCH DESK MICROPHONE	X			
TKN6842A	CAB INTFC PAGING BASE	X			
TRN6933A	HEATER, 5 PPM (SEE NOTE)	X			
TMN1018A	DESK MICROPHONE W/LUG PL"	X			
TRN6934A	HEATER, 2PPM	X			

NOTES:

1. L44TRB SERIES BASE STATION MODELS ARE OPTIONALLY AVAILABLE WITH 2PPM FREQUENCY STABILITY. PAGING BASE STATION MODELS INCLUDE STANDARD 2PPM FREQUENCY STABILITY. REFER TO INSTRUCTION SECTION 68P81035E04 IN THIS MANUAL FOR DETAILS.
2. FOR OPERATION ON L44TRB SERIES PAGING BASE STATION MODELS, REFER TO PAGING BASE STATION SUPPLEMENT 68P81030E65.

EPS-23644-O

MOTOROLA

UNIFIED CHASSIS

BREAKDOWN CHART

FOR

"MAXAR"

FM TWO-WAY RADIO

450-512 MHz

30/25 W RF POWER

ITEM	DESCRIPTION
TUE1433AB	UNIFIED CHASSIS, 1-FREQ., 450-470 MHz
TUE1433AH	UNIFIED CHASSIS, 2-FREQ., 450-470 MHz
TUE1434AB	UNIFIED CHASSIS, 1-FREQ., 470-494 MHz
TUE1434AH	UNIFIED CHASSIS, 2-FREQ., 470-494 MHz
TUE1435AB	UNIFIED CHASSIS, 1-FREQ., 494-512 MHz
TUE1435AH	UNIFIED CHASSIS, 2-FREQ, 494-512 MHz

ITEM	DESCRIPTION	TUE1433AB	TUE1433AH	TUE1434AB	TUE1434AH	TUE1435AB	TUE1435AH
TLE1833A	POWER AMPLIFIER	X	X				
TLE1834A	POWER AMPLIFIER			X	X		
TLE1835A	POWER AMPLIFIER					X	X
TLE1843A	RF DECK		X				
TLE1844A	RF DECK			X	X		
TLE1845A	RF DECK					X	X
TLE4003A	MAIN CKT BOARD	X	X				
TLE4004A	MAIN CKT BOARD			X	X		
TLE4005A	MAIN CKT BOARD					X	X
TLE4013A	MAIN CKT BOARD		X				
TLE4014A	MAIN CKT BOARD			X	X		
TLE4015A	MAIN CKT BOARD					X	X
TRN6846A	HARDWARE, MAIN CKT BOARD	X	X	X	X	X	X

EPS-23684-O

RADIO SET ACCESSORY TABLE

KIT NUMBER	DESCRIPTION	
TMN6113A	HANDSET	
TRN6319A	HANDSET HANG-UP BOX	
TRN6320A	REVERSE ESCUTCHEON	1 FREQ., CARRIER SQUELCH RADIOS
TRN6321A		2 FREQ., CARRIER SQUELCH RADIOS
TRN6322A		1 FREQ., "PRIVATE-LINE" TONE-CODED SQUELCH RADIOS
TRN6323A		2 FREQ., "PRIVATE-LINE" TONE-CODED SQUELCH RADIOS
TRN6324A		1 FREQ., DIGITAL "PL" CODED SQUELCH RADIOS
TRN6325A		2 FREQ., DIGITAL "PL" CODED SQUELCH RADIOS
TSN6022B	EXTERNAL SPEAKER	
TRN6223A	BASE STATION MOUNTING TRAY WITHOUT MICROPHONE CLIP	
TRN6318A	BASE STATION MOUNTING TRAY WITH MICROPHONE CLIP	
TRN6524A	SECURITY MOUNTING HARDWARE	
TRN6525A	RADIO-TO-TRUNNION QUICK MOUNTING SCREWS	

OPTIONS

OPTION KIT	DESCRIPTION
B561 SERIES	INDIVIDUAL CALL DECODER W/O HORN & LIGHT ALERTING
B562 SERIES	INDIVIDUAL CALL DECODER WITH HORN & LIGHT ALERTING
B563 SERIES	INDIVIDUAL & GROUP CALL DECODER WITH HORN & LIGHT ALERTING
B162 SERIES	INDIVIDUAL CALL WITHOUT HORN & LIGHT ALERTING
B163 SERIES	INDIVIDUAL CALL WITH HORN & LIGHT ALERTING
B164 SERIES	INDIVIDUAL & GROUP CALL DECODER
B165 SERIES	INDIVIDUAL & EXTENDED TONE "B" CALL

EPS-17551-C

OPERATOR'S INSTRUCTIONS

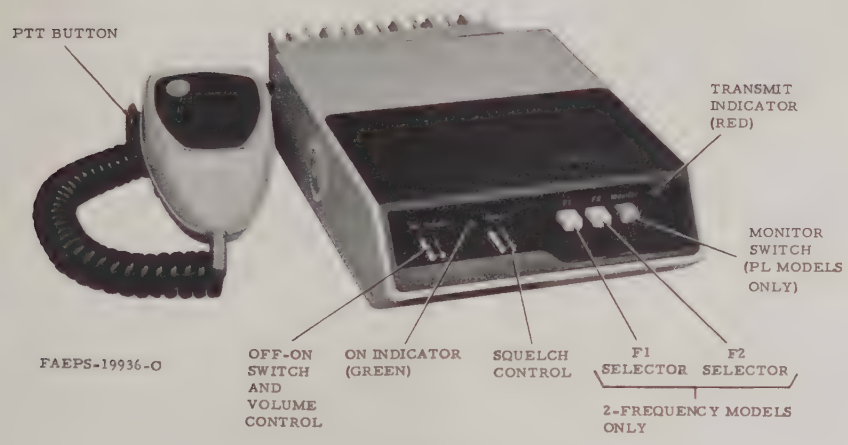


Figure 1.
Operating Controls and Indicators

1. TO TURN ON RADIO

The on-off switch for the radio set is operated by the OFF-VOLUME control. To turn on the radio set, rotate the OFF-VOLUME control knob clockwise until a click is heard. The front panel lamps then turns on to illuminate the control labels and the green ON indicator.

NOTE

When operating in extremely cold ambient temperature conditions (-10 to -30°C), allow 2 minutes after radio is turned on before transmitting to ensure compliance with FCC rules and regulations.

2. TO RECEIVE

OPERATION	PROCEDURE
1. Disable PL (PL Models only)	Press MONITOR button so it stays in. -OR- Remove microphone from hang-up box.
2. Unsquelch radio.	Turn SQUELCH control counter clockwise until noise is heard.
3. Set VOLUME control	Adjust VOLUME control for a comfortable listening level.
4. Set SQUELCH control.	Turn SQUELCH control clockwise until noise just stops.
5. Select operating frequency. (Two-frequency models only)	Press F1 or F2 button, as needed.

TO RECEIVE (Cont.)

OPERATION	PROCEDURE
The radio is now adjusted to receive *all* messages on the selected frequency.	
6. Enable PL (PL models only)	Press MONITOR button and allow it to return to the "out" position. -AND- If radio uses a microphone hang-up box, insert microphone into its hanger.
You are now able to hear messages for your system only.	

3. TO TRANSMIT

3.1 MOBILE RADIOS

OPERATION	PROCEDURE
1. Disable PL (PL models only)	Press MONITOR button so it stays in. -OR- Remove microphone from hang-up box.
2. Select operating frequency (Two-frequency models only)	Press F1 or F2 button, as needed.
3. LISTEN	DO NOT TRANSMIT if anyone is using the channel.
4. Key transmitter	Press and hold down microphone PTT button. Red light on radio front panel will glow indicating that the transmitter is "on-the-air".

TO TRANSMIT (Cont.)

OPERATION	PROCEDURE
5. Transmit message	Hold microphone about 2 inches from your lips and speak slowly into microphone at a normal voice level. Shouting will not make your message easier to understand. Make each transmission as brief as possible.
6. Receive reply	Release microphone PTT button.
7. Enable PL at end of conversation (PL models only)	allow it to return to the "out" position. -AND- Insert microphone into its hanger.

3.2 BASE STATION RADIOS

OPERATION	PROCEDURE
1. Select operating frequency (two-frequency models only)	Press F1 or F2 button, as needed.
2. Monitor the radio channel	Depress the microphone MONITOR switch.
3. Listen	Briefly listen for conversations on the radio channel.
4. Transmit the message	If the radio channel is not in use, depress and hold both the microphone MONITOR and TRANSMIT switches while speaking about 6 inches from the microphone. Speak distinctly and at a normal level. Release the TRANSMIT switch at the end of the message or to receive a reply.
5. Enable receiver muting (carrier squelch models)	At the end of the message or conversation release the microphone MONITOR switch.

NOTE

If JU2 is removed from the microphone (normal for paging base station to ensure that the operator monitors the channel) both the microphone transmit and monitor buttons must be pressed to transmit — releasing either switch ends the transmission.

PREINSTALLATION INSTRUCTIONS

1. UNPACKING

When unpacking the radio from its shipping carton, refer to the model chart at the front of this manual. If any item is missing, contact your Motorola representative immediately.

2. LICENSING REQUIREMENTS

FCC regulations state that a station license must be obtained for each radio installation (mobile or base) by the owner of the equipment. The station licensee is responsible for ensuring that the transmitter power, frequency, and deviation are within the limits permitted under the station license. Adjustments to the transmitter section of the radio may be made only by a technician possessing an FCC commercial operator's license. No license is required to install, check out, or operate the radio.

3. BENCH CHECK

3.1 INTRODUCTION

Each radio set is adjusted, tested, and inspected before shipment. However, it is recommended that both the transmitter and receiver sections of the radio be checked for proper operation just prior to installation.

3.2 TESTING

The radio should be tested with all cables and accessories supplied with the radio connected as they will be in the final installation. The frequency, deviation, and output power of the transmitter should be checked, as well as the sensitivity, squelch operation, and audio quality of the receiver. Radios with PL or DPL capabilities should be operated in that mode to verify proper encode/decode performance. Refer to the specifications page at the front of this manual to determine whether the radio is operating properly. Improper operation can generally be corrected by touching up the receiver or transmitter alignment.

4. INSTALLATION PLANNING-MOBILE RADIOS

4.1 GENERAL

Planning is the key to fast, easy radio installation. Before a hole is drilled or a wire is run, inspect the vehicle and determine how and where you intend to mount the antenna, radio set, and accessories. Plan wire and

cable runs to provide maximum protection from pinching, crushing, and overheating.

4.2 ANTENNA MOUNTING

The best mounting location for the antenna is in the center of a large, flat conductive surface. In almost all vehicles these requirements are best satisfied by mounting the antenna at the center of the roof. Some vehicles have a large trunk lid that will provide a good antenna location. If the trunk lid is used, connect grounding straps between the trunk lid and vehicle chassis to insure that the trunk lid is at chassis ground.

4.3 RADIO MOUNTING

4.3.1 General

The trunnion mount allows the radio set to be mounted to a variety of mounting surfaces. Be sure the mounting surfaces is able to adequately support the weight of the radio. Allow sufficient space around the radio for free air flow for cooling. Be sure the unit is close enough to the vehicle operator to permit easy access to operating controls while he is driving.

4.3.2 Inverted Escutcheon Installation

A front panel escutcheon with inverted lettering (Motorola Option B96) is available if you plan to mount the radio above the operator's normal line of sight. Install the inverted escutcheon as follows:

Step 1. Remove the radio chassis from its housing.

Step 2. Using a long screwdriver, push on the back of the upright escutcheon until it is free of the radio housing front panel.

Step 3. Remove the tape from the back of the inverted escutcheon. Press the inverted escutcheon onto the radio housing front panel.

Step 4. Pull the pushbuttons off the F1, F2, and monitor switches. Invert the pushbuttons and replace them on the switches.

Step 5. Reinstall the radio chassis into the housing. Be sure the chassis locking tabs properly engage the slots in the housing.

4.4 DC POWER AND WIRING

4.4.1 This radio must be operated *only* in negative-ground electrical systems. Reverse polarity will not damage the radio, but the cable fuse will blow. Check the vehicle ground polarity before you begin installation to prevent wasted time and effort.

4.4.2 Connect the red power lead through F601 to the vehicle battery positive terminal. Connecting the red lead to any other positive voltage point in the vehicle is *not recommended.*

CAUTION

If dc power is to be controlled by the vehicle ignition switch, a switching relay (Motorola Part No. 59-813674) should be used to switch the red power lead. The vehicle ignition switch, then, controls dc to the relay coil.

4.4.3 Connect the black power lead to a good ground point on the vehicle chassis. *Do not* connect the black lead directly to the battery negative terminal.

4.4.4 The wiring provided with the radio is of sufficient size to handle the maximum radio current demand. If wiring must be added to that provided, be sure the gauge of the added wire is sufficient for the current to be carried and length of the added run.

5. INSTALLATION PLANNING—BASE STATIONS

5.1 ANTENNA SYSTEM

Selecting the antenna system for your base radio depends on factors beyond the scope of this manual. Your Motorola representative can help you choose the antenna system that will best serve your particular needs.

5.2 RADIO LOCATION

Choose a location for your base radio as close as possible to where the antenna cable enters the building. Be sure 117 volt, 60 Hz power is available. Make sure sufficient air can flow around the radio to permit adequate cooling.

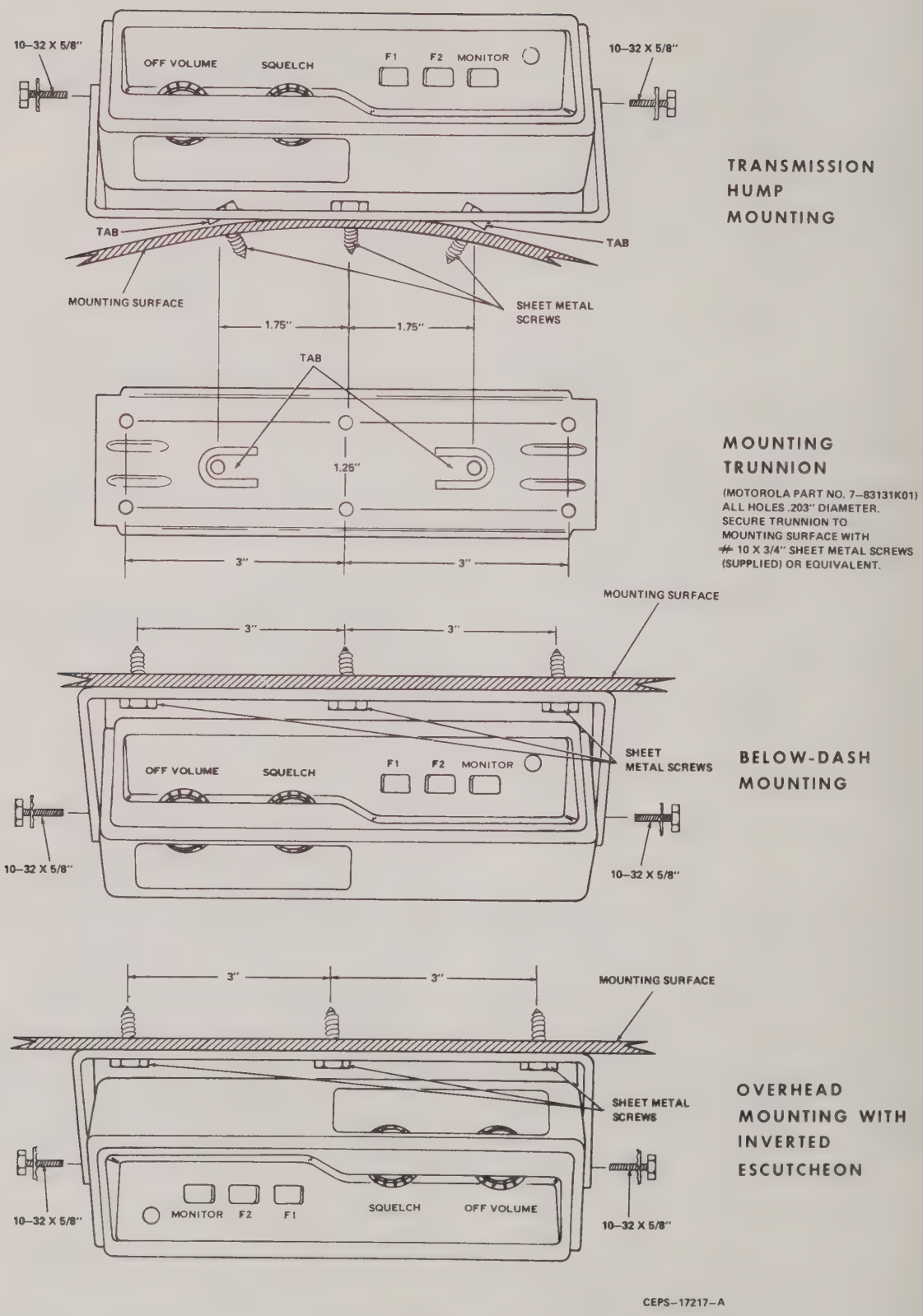


Figure 2.
Radio Mounting Detail

INSTALLATION INSTRUCTIONS

1. MOBILE RADIOS

Step 1. Mount the antenna, using the instructions provided with the antenna kit. Run the coaxial cable to the intended radio set mounting location. If necessary, cut off the excess cable and install the cable connector.

CAUTION

DO NOT CUT ANTENNA CABLE unless absolutely necessary. If cable must be shortened, higher Effective Radiated Power will be obtained as per table below. Be sure the system is licensed to operate at a higher ERP before cutting cable.

Step 2. Route power wiring, but do not make power connections and do not tie the wires down. Be sure to use grommets wherever the wiring must pass through a metal panel.

		FOR RADIO MODEL SERIES D34TRA				
	ANTENNA MODEL	Length of Cable Feet				
		6	8	10	12	14
25 Watt	TAE6054A	25W ERP	23.5W ERP	22W ERP	21W ERP	19.5W ERP
	TAE6074,5A	56W ERP	52.5W ERP	49.5W ERP	47W ERP	43.5W ERP
	TAE6094,5B	79W ERP	74.5W ERP	69.5W ERP	66.5W ERP	61.5W ERP
30 Watt	TAE6054A	21W ERP	19.5W ERP	18.5W ERP	17.5W ERP	16.5W ERP
	TAE6074,5A	47W ERP	43.5W ERP	41.5W ERP	39W ERP	37W ERP
	TAE6094,5B	66.5W ERP	61.5W ERP	58.5W ERP	55.5W ERP	52W ERP

Step 3. Mount the radio set trunnion mounting bracket (see Figure 2) or locking trunnion (see instruction section 68P81108E55 at back of this manual).

Step 4. Mount the microphone hanger or microphone hang-up box.

Step 5. Connect the power plug and coaxial cable connector to the radio set. See Figure 3. Install the radio in the trunnion mounting bracket.

Step 6. Complete the power wire installation. Be sure to leave sufficient slack wire behind the radio set to make the unit easy to remove and reinstall. Strap the wire down where necessary being sure the wires do not make contact with hot areas on the engine. Be sure the wires cannot be snagged by the operator's feet or during the normal vehicle operation. Cut off the excess power lead length and attach the terminal lugs supplied.

Step 7. If a microphone hang-up box or external speaker is used, secure wiring to those items as needed. Allow sufficient slack in wiring for future maintenance.

Step 8. Connect the power leads. Be sure the connection points are clean and free of paint, dirt, and corrosion.

Step 9. Test radio and its accessories for proper system operation. Check the antenna SWR, using an in-line wattmeter.

CAUTION

After installation, remove the protective film from the escutcheon. To remove any dust accumulation from the escutcheon, always wipe with a damp cloth.

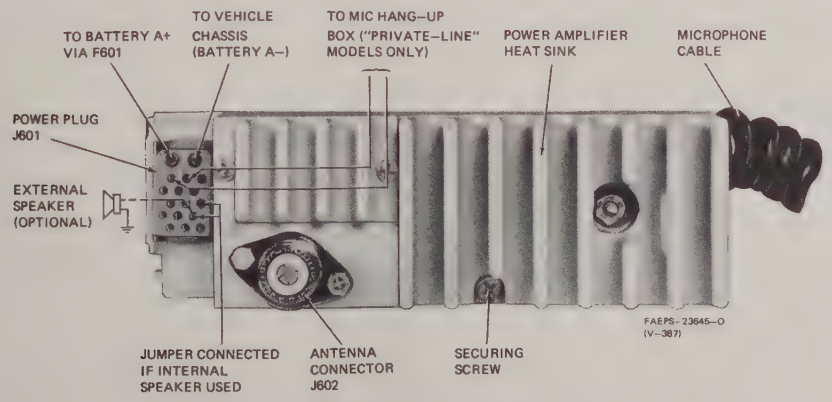


Figure 3.
Connections to Radio Set Rear Panel

2. BASE STATIONS

Step 1. Mount the radio set to the base mounting tray.

Step 2. Prepare radio set power leads as follows: Attach the provided pins to the ends of the red and black power leads. Insert power leads into the mating plug of the base station power supply output jack; red lead pin into position 4 and the black lead pin into position 1.

Step 3. Connect an in-line wattmeter between the radio antenna connector and the antenna system.

Step 4. Plug the base dc power supply into the 117 volt, 60 Hz outlet. Set the AC POWER switch on the power supply to the ON POSITION.

Step 5. Key the transmitter and check the antenna system VSWR. If the VSWR is 3:1 or lower, disconnect the wattmeter and connect the antenna coaxial cable to the radio set antenna jack.

Step 6. Test the radio set and accessories for proper operation. A brief conversation with a mobile unit in your system will indicate whether the base station is operating satisfactorily.

CAUTION

After installation, remove the protective film from the escutcheon. To remove any dust accumulation from the escutcheon, always wipe with a damp cloth.

SERVICE

1. INTRODUCTION

This radio is designed for easy servicing. All of the metering points are brought out to radio set power connector J601. For servicing information, refer to the schematic diagrams, circuit board details, and alignment procedures in this manual. Theory of operation is shown on the schematic diagrams.

2. HOUSING REMOVAL

(Refer to Figure 3)

Step 1. Remove the screws that hold the radio set in the trunnion mount.

Step 2. Insert a screwdriver blade into the screwdriver slot near the bottom of the radio chassis rear panel.

Step 3. Push the screwdriver against the housing until the chassis locking tabs clear the slots in the radio housing.

Step 4. Slide the radio chassis out the back of the housing.

3. WIRE REPLACEMENT—POWER PLUG P601

Two special wire extraction tools are available to remove wires from power plug P601; ST1145 for 0.062'' diameter pins (1-15); ST946 for 0.093'' diameter pins (A and B). This tool must be used for ease of wire extraction and to prevent damage to the connector or its pins.

REQUIRED TEST EQUIPMENT FOR "MAXAR" RADIO SERVICING

GENERAL TYPE	APPLICATION	RECOMMENDED MODEL	MIN. SPECIFICATIONS
AC-DC VOM	DC voltage measurements, general	Motorola T1009A	Measurement range: 0-15 V dc Sensitivity: 20, 000 ohms/volt
DC Multimeter	DC voltage readings requiring a high input resistance meter.	Motorola S1063A	Measurement range: 0-15 V dc Input resistance: 11 megohms
AC Voltmeter	Audio voltage measurements	Motorola S1053C	Measurement range: 0-10 V ac Input resistance: 10 megohms
RF Voltmeter	RF voltage measurements	Motorola S1339A	Measurement range: 100 uV-3 V from 1 MHz - 512 MHz Inputs: 50 ohm and high impedance
Oscilloscope	Waveform observation	Telequipment Model D61	Vertical sensitivity: 10 mV - 10 V/division Horizontal time base: 1 usec. -1 sec/division
RF Wattmeter	Transmitter output power measurement	Motorola S1350A with appropriate element and T1013A RF Dummy Load	Measurement range: 0-25 Watts
Frequency Meter	Transmitter frequency measurement	Motorola R1200A Series, S1343 Series, or S1344 Series	Measurement range: 450-512 MHz Frequency resolution: 10 Hz
Deviation Meter	Transmitter modulation deviation measurement	Motorola S1344A	Measurement range: 0-10 kHz deviation Frequency Range: 450-512 MHz
RF Signal Generator	Receiver alignment and troubleshooting	Motorola S1329A	Frequency Range: 450-512 MHz Output Level: 0.1 uV-100, 000 uV Must be capable of at least ±3 kHz deviation when modulated by 1 kHz tone.
Audio Signal Generator	Audio circuit troubleshooting	Motorola S1067A	Frequency Range: 20 Hz - 20 kHz Output Level: 50 mV - 1 V
PL Tone Generator *	Tone-Coded "Private-Line" Decoder troubleshooting	Motorola SLN6221A	Frequency Range: 50 Hz - 200 Hz Output Level: 0-500 mV
DPL Test Set **	"Digital Private-Line" Encoder-Decoder Troubleshooting	Motorola SLN6413A	
Radio Test Set w/appropriate metering cable (SKN6029A for TEK-5 and SKN6030A for Portable Test Set)	Meter readings at circuit metering points for alignment and troubleshooting	Motorola S1056B Portable Test Set, TEK5B or C Metering Panel with TEK40 Conversion Kit, or TEK5E Metering Panel. See Figure 4	See Figure 4.
10.7 MHz Signal Source	Adjustment of receive freq.		1 mV output
Tuning Tool Kit	Receiver and transmitter alignment	Motorola TRN6210A	

* Required for tone-coded "Private-Line" Models only
** Required for "Digital Private-Line" Models only

EPS-20881-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

PARTS LIST

RPX4028A Adapter Cable PL-5385-O

J101		CONNECTOR, receptacle: includes:
	15-83292K01	HOUSING, 15 pin
	29-84706E04	TERMINAL, female; 9 req'd.
P601		CONNECTOR, plug: includes:
	15-83958L01	HOUSING, 17 pin
	49-84706E03	TERMINAL, male; 9 req'd,
	29-82335A03	TERMINAL, male; 2 req'd.
F601	65-4165	FUSE, cartridge: 15 amp
NON-REFERENCED ITEMS		
	2-9627	NUT, #4; 2 req'd.
	3-114831	SCREW, 4-40 x 3/16; 2 req'd.
	4-7693	LOCKWASHER, #4, 2 req'd.
	29-82607B03	LUG, ring; 2 req'd.
	15-83957L01	HOUSING, 17 pin
	29-82336A03	TERMINAL, female; 2 req'd.
	30-82020H01	CABLE, 12 conductor
	42-10217A02	CABLE, tie
	42-80313A05	STRAIN RELIEF

SKN6029A and SKN6030A Metering Adapter Cable PL-4075-A

C1	23-82783B10	CAPACITOR, fixed: 1 uF ±20%; 50 V (not supplied)
F1	65-86099	FUSE, cartridge: 7.5 amp
J602		CONNECTOR, receptacle: includes:
	15-83292K01	SHELL, female; 2 contact
	29-84706E04	TERMINAL, 2 req'd.
P1	9-855266	CONNECTOR, plug: female; 20 contact
P601		includes:
	15-80315A39	INSULATOR, 15-circuit
	29-84706E03	TERMINAL, male, 12 req'd.
R1	6-124A89	RESISTOR, fixed: 1/4 W: 47k ±5%
R2	6-1062IE24	232k, 1%
R3	6-124C23	82 ±10%
R4	6-124A79	18k ±5%
S1	40-82148F01	SWITCH: spdt
XF1	14-82882A01	FUSEHOLDER: BODY, fuseholder
	14-82883A01	CAP, fuseholder
	42-82884A01	CLIP, fuseholder; 2 req'd.

HOW TO USE MODELS S1056A PORTABLE TEST SET WITH SKN6030A METERING ADAPTER CABLE

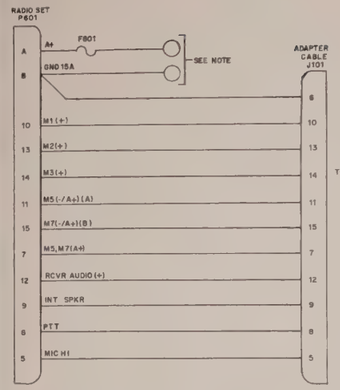
METERING POINT	TEST SET METER SELECTOR SWITCH POSITION	RCVR-XMTR ACCESSORIES SWITCH POSITION	METER OFF-REV SWITCH POSITION	REMARKS
1	1	RCVR	REV	
2	2	RCVR	REV	
3	3	XMTR	REV	
5	7	XMTR	OFF	$11N POSITION M5(A)
7	7	XMTR	OFF	$11N POSITION M7(B)
RCVR AUDIO	11	RCVR	OFF	3 VAC OR 8.2 VAC METER RANGE

RADIO MUST BE KEYED WITH "XMTR ON" BUTTON ON TEST SET WHEN TEST CABLE IS CONNECTED.

HOW TO USE TEK-5 METERING PANEL WITH SKN6029A ADAPTER CABLE

1. SET TEK-5 SELECTOR SWITCH TO POSITION C.
2. SET TEK-5 XMIT-REC SWITCH TO REC POSITION FOR M1, M2, AND RCVR AUDIO. SET XMIT-REC SWITCH TO XMIT FOR M3, M5 AND M7
3. DURING "IDC" ADJUSTMENT RADIO MUST BE KEYED WITH "KEY" BUTTON IF AUDIO IS APPLIED AT CABLE MIC AUDIO INPUT

EPS-23815-O



RPX4028A ADAPTER CABLE FOR USE WITH SKN6030A AND SKN6029A METERING ADAPTER CABLES

NOTE:

1. WHEN USING THE RPX4028A, POWER CONNECTIONS FOR A+ AND GND ARE MADE VIA P601-A AND P601-B. POWER CONNECTIONS AVAILABLE WITH THE SKN6029A AND SKN6030A METERING ADAPTER CABLES ARE NOT USED

WHEN USING THE SKN6029A, MAKE POWER CONNECTIONS AS FOLLOWS:

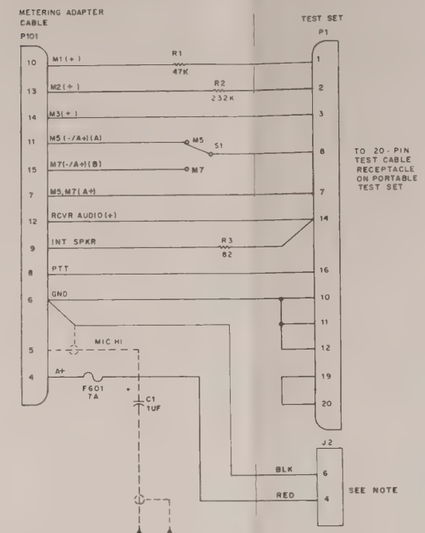
1. ATTACH P601-A RING LUG TO POSITIVE TERMINAL OF BENCH POWER SUPPLY OF PROPER TYPE
2. ATTACH P601-B TO NEGATIVE TERMINAL OF BENCH POWER SUPPLY

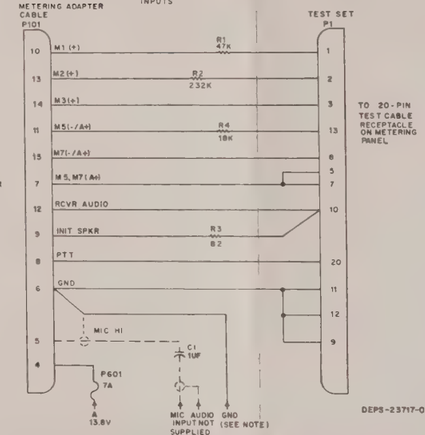
WHEN USING THE SKN6030A, POWER CONNECTIONS ARE MADE VIA THE VEHICLE POWER CONNECTOR. IN THESE CASES, THE RPX4028A ADAPTER CABLE MUST BE MODIFIED AS FOLLOWS

1. REMOVE RING LUGS FROM P601-A AND P601-B.
2. ATTACH LEADS FROM P601-A AND P601-B TO POSITIONS A AND B RESPECTIVELY OF SUPPLIED 17 PIN CONNECTOR (MOTOROLA PART NO. 15-83957L01, DETAIL SHOWN BELOW).
3. MAKE POWER CONNECTIONS BY CONNECTING THE NEW 17-PIN CONNECTOR TO THE VEHICLE POWER CONNECTOR.

Figure 4. Metering Adapter Cables

SKN6030A METERING ADAPTER CABLE FOR USE WITH MODEL S1056A PORTABLE TEST SET





SKN6029A METERING ADAPTER CABLE FOR USE WITH MODEL TEK-5B OR C METERING PANEL, EQUIPPED WITH TEK-40 CONVERSION KIT OR TEK-5E METERING PANEL

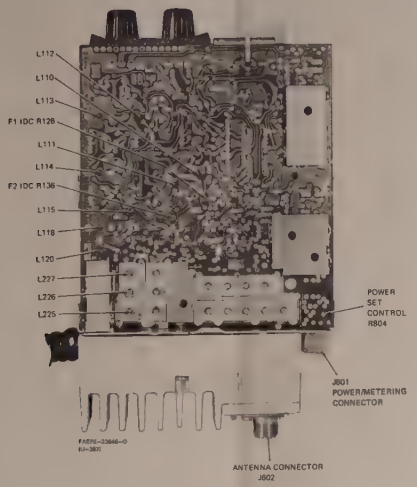
TEST EQUIPMENT

METERING ADAPTER CABLES AND ADAPTER CABLE

TEST EQUIPMENT, METERING ADAPTER CABLES, AND ADAPTER CABLE

PEPS-23718-O
3/18/77-VG

TRANSMITTER ALIGNMENT PROCEDURE



TRANSMITTER METERING

TRANSMITTER METER READINGS, USING
TEK-5 METERING PANEL OR S1056B PORTABLE TEST SET

METER	MEASUREMENT	READING, (uA)	REMARKS
3	Buffer Amplifier Input	8 (MIN)	
5	Exciter Amplifier Collector Current	25 (TYP.) 40 (MAX)	
7	PA Current	13.5 (TYP.) 17.5 (MAX)	Multiply M7 x 0.336 to Obtain PA Final Current in Amps

TRANSMITTER METER READINGS WITH 20,000 OHM/VOLT VOLTMETER

METERING FUNCTION	VOLTMETER LEAD CONNECTIONS		VOLTMETER SCALE	TYPICAL READING
	+	-		
M3 Buffer Ampl. Input	J601-14	Chassis Ground	50 uA, DC	8 uA min.
M5 Exciter Output Amplifier Collector Current	J601-7	J601-11	100 mA, DC	17 mA, Typ 100 mA, Max
M7 PA Current	J601-7	J601-15	500 mA, DC	230 mA Typ. 300 mA Max.

TRANSMITTER

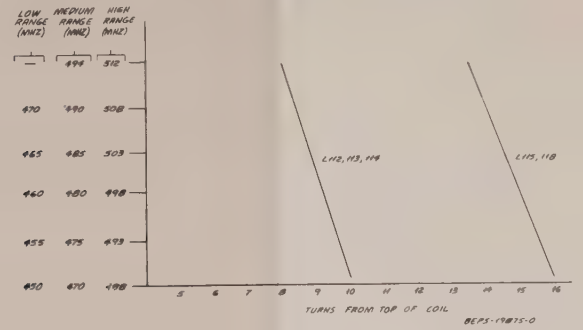
PREALIGNMENT NOTES

1. In some cases, peak readings may occur at two points in the tuning range of a coil. Always choose point where slug is nearest top of coil form (away from circuit board).
2. Unnecessary tuning adjustments should be avoided. Usually, only a "touch-up" transmitter alignment is needed. Complete transmitter alignment is needed in the following cases:
   a. After changing transmitter operating frequency.
   b. After replacing a component in a frequency-sensitive network.
3. Before beginning a complete alignment, preset tuning adjustments as follows:
   a. Set L120 7 turns from top of form.
   b. Set C613 one turn counterclockwise from tight.
   c. Set C615 fully counterclockwise from tight (full out).
   d. Set L110 (and L111 in 2-frequency models) 7 turns from circuit board.
   e. Starting with slugs of L225, 226, and 227 flush with tension nut, set slugs 6 turns above nut.

CAUTION

Low or no meter 3 reading will be obtained if L110 and L111 are not properly preset.

   f. Set L112, L113, L114, L115, and L118 according to the following chart:



   g. Set power set control R804 fully counterclockwise (viewed from solder side of board) for maximum xmtr power output.
4. Key transmitter for each step in alignment procedure and de-key after alignment step is completed. Avoid keying an unaligned transmitter for prolonged periods.
5. Two-frequency radios should be aligned on lowest operating frequency.
6. Transmitter frequency calculations:

   $f_c = 27 f_{osc}$, where f_c = carrier frequency, and f_{osc} = crystal oscillator frequency.

SET-UP

1. If a TEK-5 Metering Panel or a S1056B Portable Test Set is available, connect the metering panel or test set to J601 using the appropriate metering adapter cable. The metering adapter cables and directions for their use are shown in Figure 4. Metering may be accomplished with a 20,000 ohm-per-volt voltmeter if a test set or metering panel is not available. Refer to the metering tables on this page.
2. Connect an rf wattmeter, terminated in a resonant antenna or 50-ohm resistive dummy load, to radio set antenna connector J602.
3. Connect a dc power supply to the power leads of the test cable. Set the power supply output to 13.8 volts.

TRANSMITTER ALIGNMENT

NOTE

Two-frequency radios should be tuned on lowest frequency.

STEP	ADJUST	METERING POINT	DESIRED READING
1. Oscillator Output	L112, then L113	M3	Peak
2. Buffer Output	L114	M3	Dip if no M5 reading
		M5	Peak if M4 has a reading
3. First Tripler Output	L115 then L118	M5	Peak
4. Second Tripler Output	L120	Wattmeter	Peak if wattmeter has reading
		M5	Peak if no wattmeter reading
5. Predriver Output	C607	Wattmeter	Peak. If no wattmeter reading, go to step 6.
6. Second Tripler Output Filter	L225, 226, 227	Wattmeter	Peak. If no wattmeter reading, turn C607 1/4 T clockwise and repeat step 6.
7. Predrive and Final Output	C607, 613, 615	Wattmeter	Peak
8. Repeat all adjustments made to this point.			
9. Predriver Output	C607	Wattmeter	Adjust for 20 watt output.
10. Second Tripler Output	L225, 226, 227	Wattmeter	Peak each coil while keeping wattmeter reading between 20 and 25 watts with C607.
11. Oscillator Output	L112	Wattmeter	Adjust for 15 watts output.
	L113	Wattmeter	Adjust for 15 watts output if not obtainable by tuning L112 alone.
12. Second Tripler Output	L120	Wattmeter	Peak. If wattmeter reading is greater than 20 watts, repeat steps 11 and 12.
13. Repeat Step 10			
14. Oscillator	L112, then L113	M3	Peak
15. Predriver Output	C607	Wattmeter	Peak

For widespaced operation (greater than 2 MHz separation), go to step 16A; otherwise go to step 17.

NOTE

STEPS 16A THROUGH F ARE FOR WIDE-SPACED FREQUENCY OPERATION ONLY.

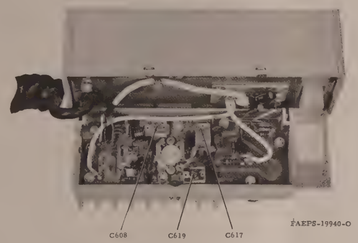
STEP	ADJUST	METERING POINT	DESIRED READING
16A	L112	M3	Peak on higher frequency
16B	L115	M5	Peak on higher frequency
16C	L114	M5	Peak on lower frequency
16D	C607	Wattmeter	Adjust for 20 watt output power on higher frequency.
16E	L225	Wattmeter	Peak on higher frequency
16F	C607	Wattmeter	Peak
17. Power Output	R804	Wattmeter	Adjust R804 to reduce power output to 33 watts (28 watts for 470-512 MHz band). For widespaced operation, set R804 so that the channel with the lowest power output is 32 watts (27 watts for 470-512 MHz band).
18. Final Output	C613, 615	Wattmeter	Retune for maximum power output. For wide-spaced operation, retune on lower frequency.
19. Repeat steps 17 and 18 as needed.			
20. Power Output	R811	Wattmeter	Jumper base of Q804 to ground through 6.2kΩ resistor. Adjust R811 for 16 watts power output on frequency with lowest power output.
21. Close power amplifier housing and tighten heatsink to chassis.			
22. Power Output	R804	Wattmeter	Repeat step 17. Keep M7 below 17.5 uA.

NOTE

If the maximum power output obtainable is less than 33/28 watts, go back to step 2 of the exciter alignment procedure and repeat the alignment a second time. If the maximum obtainable power output is still below 33/28 watts, proceed as follows:

IF MAXIMUM IS BETWEEN 31/26 AND 33/28 WATTS:
Set R804 so that power output just begins to drop (less than 1/2 watt).

IF MAXIMUM IS LESS THAN 30/25 WATTS:
The transmitter may be malfunctioning. Refer to the transmitter schematic diagram for troubleshooting information.



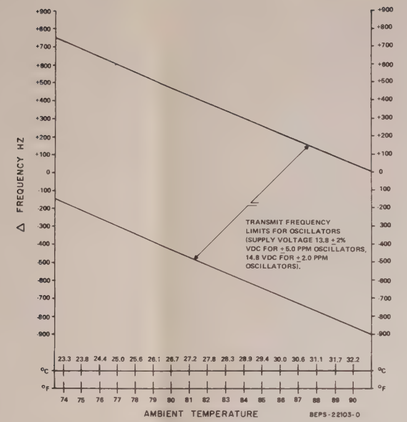
OSCILLATOR FREQUENCY ADJUSTMENT

Oscillators should be set on frequency AFTER transmitter has been aligned and BEFORE modulation deviation is set. On radios with transmitter frequency stability of 2 ppm, refer to instruction section 68P81035E04 before performing the following procedures.

NOTE

The transmit frequency of this radio should only be adjusted when the ambient temperature is 82°F (28°C). Because of temperature and voltage variations between factory and field locations, the frequency measured may not correspond to the assigned frequency. If the measured frequency is between the limits shown on the graph given below make no attempt to correct the frequency.

ACCEPTABLE LIMITS FOR FIELD FREQUENCY MEASUREMENTS FOR MAXAR UHF RADIOS



If the measured frequency does not fall within the limits shown on this graph, it is recommended that the radio be returned to a room temperature environment (approximately 82°F, 28°C) and the frequency reset using the procedure described below.

SET-UP

1. Set up the frequency meter or counter controls as required.
2. In tone-coded "Private-Line" (PL) radios, remove the "Vibrasponder" resonant reed from its socket on the PL board.
   In "Digital Private-Line" (DPL) radios, set encoder amplitude to zero by adjusting R342 (fully CCW from plating side of board).

FREQUENCY ADJUSTMENT PROCEDURE

STEP	PROCEDURE
1	Select F1
2	Key transmitter with no modulation
3	Adjust L110 for F1 frequency ±100 Hz
	Two-Frequency Models Only
4	Select F2
5	Adjust L111 for F2 frequency ±100 Hz

TRANSMITTER ALIGNMENT PROCEDURE (cont'd.)

IDC ADJUSTMENT

Oscillator frequency adjustment must be made BEFORE setting the IDC controls.

SET-UP

1. Set the deviation meter operating controls as needed.
2. In tone coded "Private-Line" radios, remove the "Vibrasponder" resonant reed from its socket on the PL board.
   In "Digital Private-Line" radios, set encoder amplitude to zero by adjusting R342 (fully CCW from plating side of board.)
3. Disconnect mic input lead (red) from main circuit board.
4. Connect the output of an audio signal generator to J601 as follows:
   High side through a 1 uF capacitor (+ end toward the radio) to J601-5.
   Low side to J601-6 or radio chassis.

NOTE

The transmitter must be keyed by pressing the KEY button on the test set or by shorting J601-8 to J601-6 or the radio chassis. DO NOT USE THE MICROPHONE PTT SWITCH TO KEY THE TRANSMITTER DURING IDC ADJUSTMENT.

5. Connect an ac VTVM across the audio signal generator output.

IDC ADJUSTMENT PROCEDURE:

STEP	PROCEDURE
1	Set audio signal generator output frequency to 1000 Hz and output level to 0.8 V.
2	Select F1 and key transmitter. Adjust F1 "IDC" control R126 for ±5 kHz deviation meter reading.
3	On 2-freq. models, select F2 and key transmitter. Adjust F2 "IDC" control R136 for ±5 kHz deviation meter reading.
4	Reduce audio signal generator output level until deviation meter reads ±3.0 kHz. Audio oscillator output level should be 160 mV ±3 dB.
	TONE CODED "PRIVATE-LINE" MODELS ONLY
5	Insert resonant reed into socket on PL board and disconnect audio oscillator from J601.
6	Key transmitter and adjust Tone Level control R433 for PL tone deviation reading of ±800 Hz.
7	Reconnect audio signal generator to J601-5 and -6 and repeat steps 1 through 3. Be sure overall deviation does not exceed ±5 kHz, including PL tone.
	or
	"DIGITAL PRIVATE-LINE" MODELS ONLY (SEE NOTE)
5	Disconnect the audio signal generator from J601.
6	Key the transmitter and adjust Code Level set control R342 for a DPL code deviation reading of 900 Hz.
7	Reconnect the audio signal generator to J601-5 and -6. Repeat steps 5 and 6. Be sure overall deviation does not exceed ±5 kHz, including DPL code. 1 through 3.

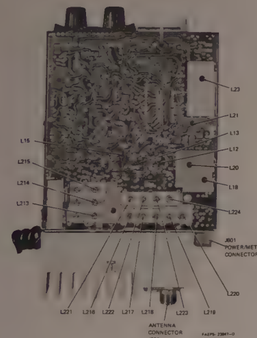
NOTE

DEVIATION MEASUREMENT

To obtain accurate measurement of transmitter deviation in radios equipped with "Digital Private-Line" binary-coded squelch, the frequency response of the deviation measuring equipment must be ≤1 Hz. If a deviation meter with this low frequency response characteristic is not available, the transmitter deviation can be checked by making the transmitter send continuous Turn-Off code during the measurement. Since the Turn-Off code waveform is sinusoidal, standard test equipment will then provide an accurate deviation measurement. To make the transmitter send continuous Turn-Off code, short together the base and emitter plating of PTT Inverter Q309 and key the transmitter.

Motorola No. PEPS-23880-O
(Sheet 2 of 2)
3/18/77-VG

RECEIVER ALIGNMENT PROCEDURE



RECEIVER METERING

TYPICAL RECEIVER METER READINGS WITH
TEK-5 METERING PANEL OR S1056B PORTABLE TEST SET

METER	MEASUREMENT	READING, uA
1	IF Amplifier Signal Level	8-14 (No Signal) 50 (40 uV Input)
2	Quadrature Detector Output	24 ±1
3	Injection Oscillator Output	15 - 25 uA

RECEIVER METER READINGS WITH 20,000 OHM/VOLT VOLTMETER

METERING POINT	VOLTMETER LEAD CONNECTIONS		VOLTMETER SCALE	TYPICAL READINGS
	+	-		
M1 IF Ampl. Signal Level	J601-10	Chassis Ground	2.5 V DC	.25 -.5 V (No Signal) 1.75 V (40 uV Input)
M2 Quadrature Detector Output	J601-13	Chassis Ground	10 V DC	5.2 V ±.2 V
M3 Injection Osc. Output	J601-14	Chassis Ground	50 uA DC	15-25 uA

RECEIVER

PREALIGNMENT NOTES

1. On "Digital Private-Line" and "Private-Line" radio sets, disable the DPL or PL decoder by depressing the front panel MONITOR pushbutton.
2. In some cases, peakmeter readings may occur at two points in the tuning range of a coil. Always choose point where the slug is nearest the top of the coil form (away from the circuit board).
3. Unnecessary tuning adjustments should be avoided. Usually, the receiver will require only a "touch-up" alignment. Complete receiver alignment is necessary in the following cases:
   a. After changing the receiver operating frequency.
   b. After replacing a component in a frequency-sensitive network.
4. Before beginning a complete receiver alignment, preset tuning adjustments as follows:
   a. Set L221, 222, 223, 224 9 turns CCW from fully in position.
   b. Set L213, 214, 215, 216, 217, 218, 219, 220 7 turns CCW from fully in position.
   c. Set L12, 13, 15, 18, 20, 21, 23 flush with main circuit board.
5. Receiver frequency calculations:

$$f_{osc} = \frac{f_c - 10.7\ MHz}{9} \quad \text{and} \quad f_{inj} = 9f_{osc} = f_c - 10.7\ MHz;$$

Where f_c = carrier frequency, f_{osc} = oscillator crystal frequency, and f_{inj} = mixer injection freq.

6. Two-frequency radios should be tuned on the higher operating frequency.

TEST EQUIPMENT SET-UP

1. If a TEK-5 Metering Panel or a S1056B Portable Test Set is available, connect the metering panel or test set to J601 using the appropriate metering adapter cable. The metering adapter cables and directions for their use are shown in Figure 4. Metering may be accomplished with a 20,000 ohm-per-volt voltmeter if a test set or metering panel is not available. Refer to the voltmeter metering table on this page.
2. Connect a dc power supply to the power leads of the test cable. Set the power supply output to 13.8 volts.

RECEIVER ALIGNMENT PROCEDURE

NOTE

Transmitter alignment must be performed before receiver alignment.

Step	Input Signal	Signal Input Point	Adjust	Monitoring Point	Desired Reading
1 Quadrature Detector	10.7 MHz @ 1 mV	Near Q12; allow signal to "spray" into circuit (Note 1)	L23	Meter 2 or VTVM at J601-13	24 ±1 uA or 5.8 V DC
2 Injection Oscillator			Freq Select Switch in "F1", adjust L13	Meter 3	Peak
			Freq Select Switch in "F2", adjust L12	Meter 3	Peak
			Freq Select Switch to lowest freq position, then:		
			L15	Meter 3	Max
			L221		Peak
			L222		Dip
			L223		Peak
			L224		Dip

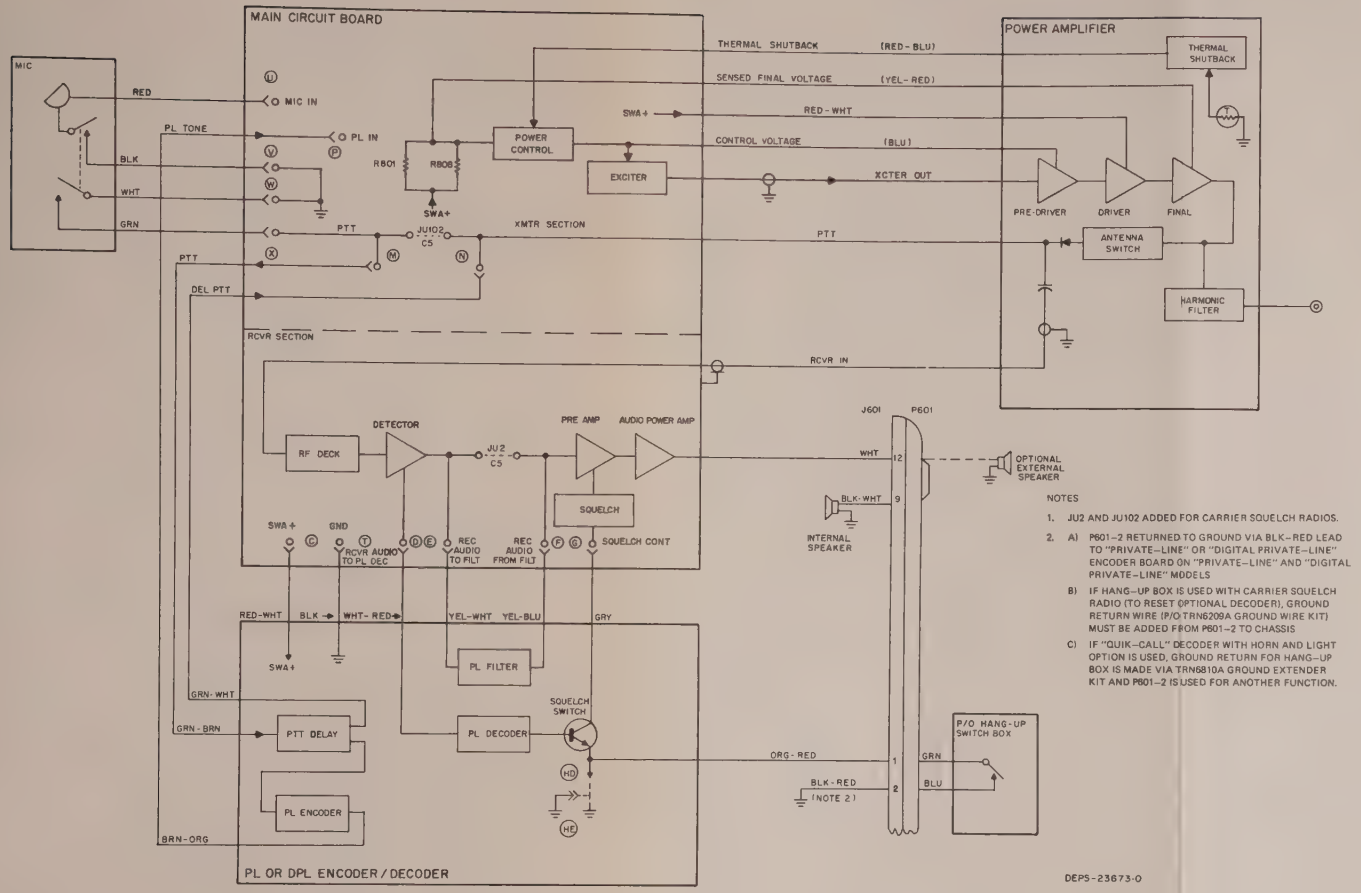
RECEIVER ALIGNMENT PROCEDURE

Step	Input Signal	Signal Input Point	Adjust	Monitoring Point	Desired Reading
3 Preselector	Adjust unmodulated signal gen. to receive freq. (max. on M1; ±18 kHz of for-	Antenna Connector	Set Freq. Select Switch to highest freq. position, then adjust L220, 219, 218, 217,		Peak. (Adjust signal generator input level to keep M1 in the 25 uA-35 uA range)
4 Preamp Input	Receive freq. @ 10 mV (Note 2)	Antenna Connector	L213, 214, 215,	Meter 1	Peak. (Adjust signal generator input level to keep M1 in the 25 uA-35 uA range)
5 Fine Freq Adj	Receive freq. (counted)	Antenna Connector	L13 for freq #1 L12 for freq #2 (2 freq radios only)	Radio Speaker	Audio zero beat
	10.7 MHz Osc.	"Spray" into base of Q12 (Note 1)			
6 IF Tuning	Receive Freq. (counted)	Antenna Connector	L18, 20, 21	Meter 1	Peak M1 with L18, 20, 21, then detune
7 Injection Touch-Up	Receive Freq- (no modulation) Adjust level for 30 uA reading on M1.	Antenna Connector	L15	Meter 1	Detune CW for 20 uA reading on M1.
			L224, 223, 222, 221; then repeat L15	Meter 1 Meter 3	Peak Peak
8 Final Touch-Up	Set to highest receive frequency		Detune CCW 1/2 turn L216, 217, 218, 219, 220		
	Receive freq. (no modulation)		L220, 219, 218 217, 216 and 215 in descending order.		Maximum quieting (Adjust signal level to maintain approx. 20 dBq)

NOTES:
1. With a wire connected to a 10.7 MHz signal source output, "spray" the signal near Q12 (that is, place the wire in close proximity to Q12) but do not allow the wire to make physical contact with any part of the i-f amplifier.
2. To set signal generator on frequency without a frequency counter, open receiver squelch and adjust the signal generator frequency until receiver quiets. Carefully adjust signal generator frequency for 24 uA meter 2 reading or for a 6.0 volt dc vtvm reading at U10-6.

20 DB QUIETING SENSITIVITY MEASUREMENT

1. Connect an ac vtvm across the speaker.
2. On PL model radio sets, disable PL by depressing the MONITOR button on the radio set front panel.
3. Turn the SQUELCH control fully counterclockwise.
4. Turn on the radio set and adjust the VOLUME control until a reading of 2 volts is obtained on the ac vtvm.
5. Connect an rf signal generator to the radio set antenna connector. Set the signal generator to the carrier frequency, and set the generator output level control to minimum.
6. Slowly increase the output level of the rf signal generator until the ac vtvm reads 0.2 volts.
7. Note the signal generator output signal level. This signal level is the 20 dB quieting sensitivity of the receiver.



NOTES

1. JU2 AND JU102 ADDED FOR CARRIER SQUELCH RADIOS.
2. A) P601-2 RETURNED TO GROUND VIA BLK-RED LEAD TO "PRIVATE-LINE" OR "DIGITAL PRIVATE-LINE" ENCODER BOARD ON "PRIVATE-LINE" AND "DIGITAL PRIVATE-LINE" MODELS
   B) IF HANG-UP BOX IS USED WITH CARRIER SQUELCH RADIO (TO RESET OPTIONAL DECODER), GROUND RETURN WIRE (P/O TRN6209A GROUND WIRE KIT) MUST BE ADDED FROM P601-2 TO CHASSIS
   C) IF "QUIK-CALL" DECODER WITH HORN AND LIGHT OPTION IS USED, GROUND RETURN FOR HANG-UP BOX IS MADE VIA TRN6810A GROUND EXTENDER KIT AND P601-2 IS USED FOR ANOTHER FUNCTION.

Maxar UHF Radio
Functional Interconnect Diagram
Motorola No. DEPS-23673-O
3/18/77-VG

HANDLING PRECAUTIONS FOR CMOS INTEGRATED CIRCUITS

Many of the integrated circuit devices used in communications equipment are of the CMOS (Complementary Metal Oxide Semiconductor) type. Because of their high open circuit impedance, CMOS ICs are vulnerable to damage from static charges. Care must be taken in handling, shipping, and servicing them and the assemblies in which they are used.

Even though protection devices are provided in CMOS IC inputs, the protection is effective only against overvoltage in the hundreds of volts range such as are encountered in an operating system. In a system, circuit elements distribute static charges and load the CMOS circuits, decreasing the chance of damage. However, CMOS circuits can be damaged by improper handling of the modules even in a system.

To avoid damage to circuits, observe the following handling, shipping, and servicing precautions:

(1) Prior to and while servicing a circuit module, particularly after moving within the service area, momentarily touch both hands to a bare metal earth grounded surface. This will discharge any static charge which may have accumulated on the person doing the servicing.

(2) Whenever possible avoid touching any electrically conductive parts of the circuit module with your hands.

(3) Normally, circuit modules can be inserted or removed with power applied to the unit. However, check the INSTALLATION and MAINTENANCE sections of the manual as well as the module schematic diagram to insure there are no objections to this practice.

(4) When servicing a circuit module, avoid carpeted areas, dry environments, and certain types of clothing (silk, nylon, etc.) because they contribute to static buildup.

5 All electrically powered test equipment should be grounded. Apply the ground lead from the test equipment to the circuit module before connecting the test probe. Similarly, disconnect the test probe prior to removing the ground lead.

(6) If a circuit module is removed from the system, it is desirable to lay it on a conductive surface (such as a sheet of aluminum foil) which is connected to ground through a resistance of approximately 100k.

WARNING

If the aluminum foil is connected directly to ground, be cautious of possible electrical shock from contacting the foil at the same time as other electrical circuits.

(7) When soldering, be sure the soldering iron is grounded.

(8) Prior to connecting jumpers, replacing circuit components, or touching CMOS pins (if this becomes necessary in the replacement of an integrated circuit device), be sure to discharge any static buildup as described in procedure 1. Since voltage differences can exist across the human body, it is recommended that only one hand be used if it is necessary to touch pins on the CMOS device and associated board wiring.

(9) When replacing a CMOS integrated circuit device, leave the device in its metal rail container or conductive foam until it is to be inserted into the printed circuit module.

(10) All low impedance test equipment (such as pulse generators, etc.) should be connected to CMOS device inputs after power is applied to the CMOS circuitry. Similarly, such low impedance equipment should be disconnected before power is turned off.

(11) Replacement modules shipped separately from the factory will be packaged in a conductive material. Any modules being transported from one area to another should be wrapped in a similar material (aluminum foil may be used). NEVER USE NONCONDUCTIVE MATERIAL for packaging these modules.

B227 OPTION
2 PPM TRANSMIT FREQUENCY STABILITY

FOR L44TRB SERIES
BASE RADIO SETS

1. DESCRIPTION

Option B227 increases the transmitter frequency stability of the high performance UHF MAXAR radio from 5 ppm (parts per million) to 2 ppm to comply with FCC base station requirements. To accomplish this, high stability crystal ovens are used, the crystal temperature regular circuit is modified, and a heater control board is added to provide separate temperature control for the receiver crystal heaters. Refer to instruction section 68P81034E83 for schematic details.

NOTE

Transmitter 2 ppm stability is not required if the MAXAR transceiver is operated as a fixed site mobile communicating with other mobiles through a repeater.

2. ALIGNMENT

2.1 Radios with the B227 option and paging base stations should only be aligned if powered by the TPN1154A Base Station Power Supply. If one is not available set the output of the dc supply used for 14.8 V dc.

2.2 Allow 15 minutes warmup time to stabilize the crystal operating temperatures before making any adjustments.

2.3 If the oven cover has been removed to inspect or change transmitter crystals, make sure that the cover is replaced properly. A slight downward pressure will be required to set the cover firmly in place. Replace the holddown clip.

2.4 Because of aging characteristics, it is recommended that the transmitter frequency be aligned every three months for the first year of operation.

NOTE

The 2 ppm frequency stability option (B227) imposes several restrictions on radio operation.

1. Radio must be operated inside housing with all knobs, etc. in place.

2. The radio should be mounted in basically a horizontal position.

3. The radio must be powered by TPN1154A base station power supply.

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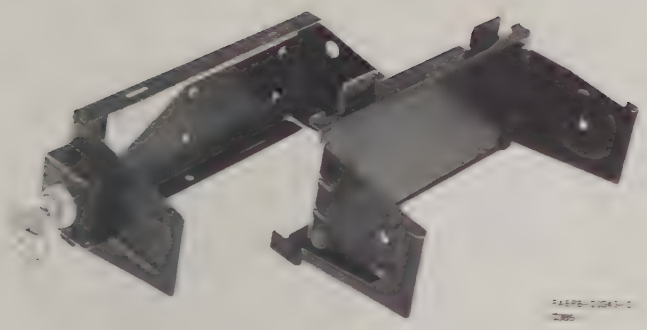
3/18/77-VG

LOCKING TRUNNION

MODEL TRN5992A



1. DESCRIPTION

The Model TRN5992A Locking Trunnion consists of a two piece trunnion type mounting bracket equipped with a key lock and associated mounting screws and is designed to facilitate ease of removal.

2. MOUNTING CONSIDERATIONS

Before attempting to install the locking trunnion, examine the vehicle for suitable mounting locations. The bracket requires a flat mounting surface at least 8" x 2" with adequate clearance for inserting the radio set. The chosen location should also be convenient to the vehicle operator and provide access to power and antenna connections. Be careful to choose a location which permits the locking trunnion to be removed from the mounting bracket. Vehicle operation should in no case be impaired.

3. INSTALLATION

3.1 GENERAL

The locking trunnion may be mounted on either metal or plastic surfaces. Examine the vehicle for suitable mounting locations (see paragraph 2) and perform the applicable procedure shown below.

3.2 INSTALLATION ON METAL SURFACES (Refer to Figure 1)

Step 1. Using the mounting bracket as a template, drill six 3/32-inch holes.

Step 2. Using the six #10 - 12 x 3/4" screws provided, attach the mounting bracket to the mounting surface. Allow 3/4" clearance in front of bracket so that locking trunnion may be inserted.

Step 3. Attach radio to the locking trunnion using the two #10 - 32 x 5/8" screws provided.

Step 4. Insert the locking trunnion into the mounting bracket by first sliding the large flanges into the slots at the rear of the mounting bracket and then sliding the small locking flanges into the slots at the front of the mounting bracket.

Step 5. Lock the locking trunnion into the mounting bracket using the key provided.

3.3 MOUNTING ON PLASTIC OR WEAK METAL SURFACES

Mounting the security trunnion on plastic surfaces is similar to that described in for metal surfaces. Follow the procedure given in paragraph 3.2 and use a large metal backing plate to strengthen the installation.

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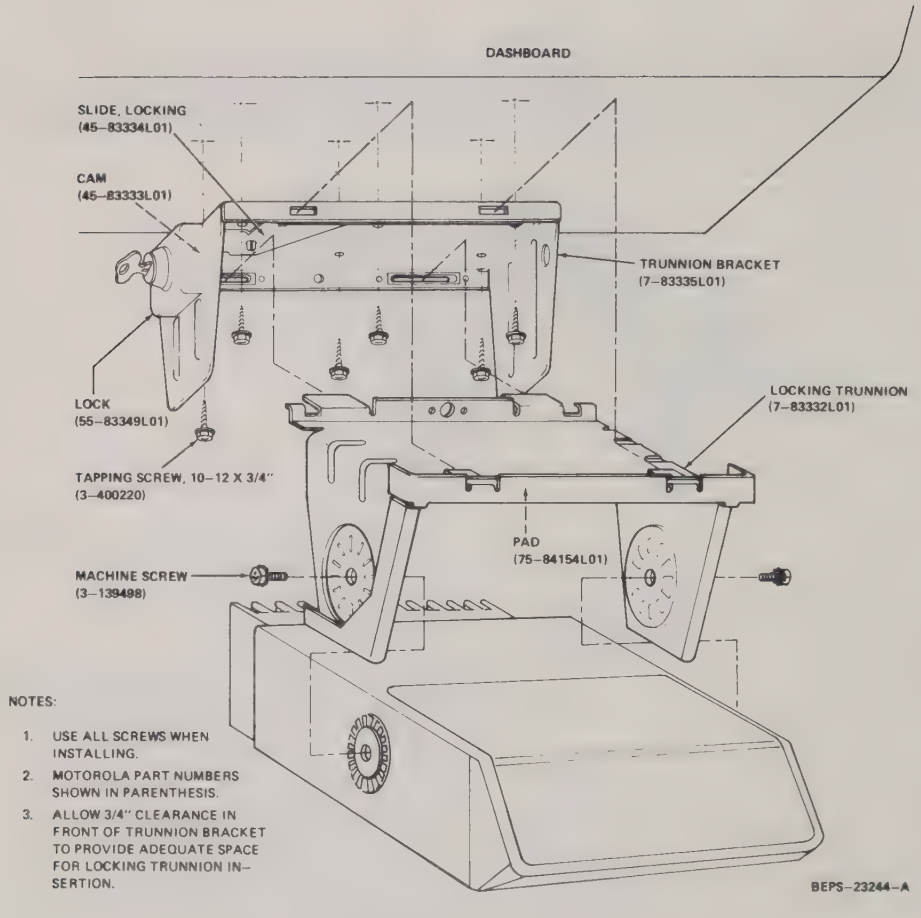
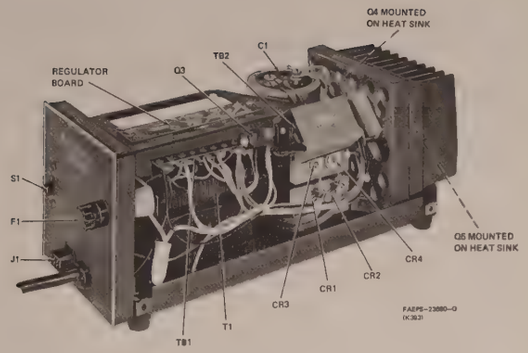


Figure 1. Locking Trunnion Mounting



PARTS LIST

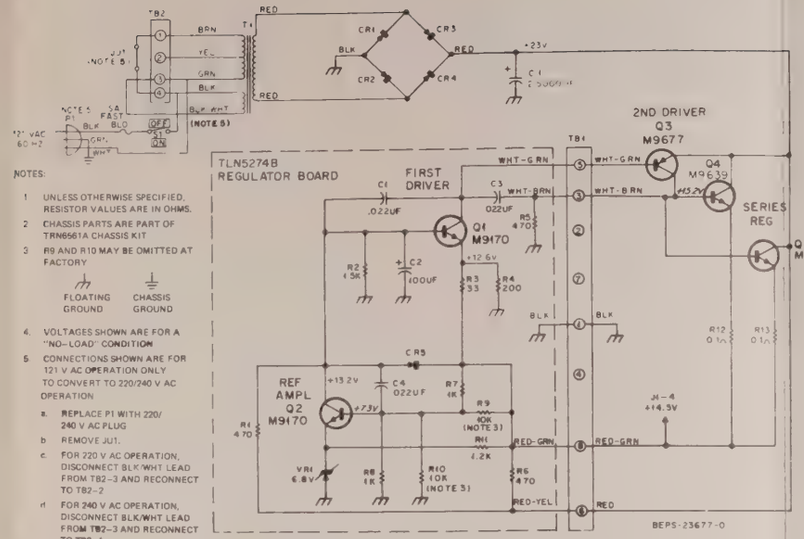
TLN5274B Regulator Board — PL-5361-O

REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
		CAPACITOR, fixed: uF:
C1	8-82905G02	.022 ±10%; 50 V
C3, 4	8-82905G02	.022 ±10%; 50 V
C2	23-83908L01	100 +75-10%; 25 V
		SEMICONDUCTOR DEVICE, diode: (SEE NOTE)
CR5	48-82392B03	silicon
		TRANSISTOR: (SEE NOTE)
Q1, 2	48-869170	NPN; M9170
		RESISTOR, fixed: ±5%; 1/2 W unless otherwise stated
R1	6-400812	470
R2	6-400459	1.5k
R3	6-400422	33
R4	17-82177B40	200; 5 W
R5, 6	6-5593	470 ±10%; 1 W
R7, 8	6-6411	1k
R9, 10	6-6320	10k ±10% (NOTE: Use is optional; determined at factory)
R11	6-6393	1.2k ±10%
		SEMICONDUCTOR DEVICE: diode: (SEE NOTE)
VR1	48-83696E01	silicon; Zener type; 6.8 V ±5%

NOTE: Replacement diodes and transistors must be ordered by listed part number only for optimum performance.

TRN6561A Power Supply Chassis — PL-5362-O

REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
C1	23-82464C10	CAPACITOR, fixed: 25,000 uF +75-10%; 40 V
		SEMICONDUCTOR DEVICE; diode: (SEE NOTE)
CR1, 2	48-82732C07	silicon
CR3, 4	48-82732C10	silicon
		CONNECTOR, receptacle: includes: 15-10183A52 INSULATOR, 6-contact 29-82335A01 CONTACT, male; 2 req'd.
J1		
F1	65-52293	FUSE, cartridge: fast-blow type; 5 A
P1	30-83212F01	LINE CORD: includes: ac plug
Q3	48-869677	TRANSISTOR: (SEE NOTE) PNP; type M9677
Q4, 5	48-869639	NPN; type M9639
S1	40-84622B02	SWITCH, slide: DPST
R12, 13	17-82177B50	RESISTOR, fixed: ±10%; 7 W 0.1
T1	25-84638C02	TRANSFORMER, power: pri: res. 4.9 ohms (240 volt configuration) sec: res. 0.035 ohms
TB1	31-121700	TERMINAL STRIP: 8 terminals; No. 2 & 7 mtg.
TB2	31-898341	4 terminals, screw
XF1	9-82083C01	FUSEHOLDER: extractor post type
	NON-REFERENCED ITEMS	
	26-84923B03	HEATSINK
	1-80794B65	HOUSING, power supply

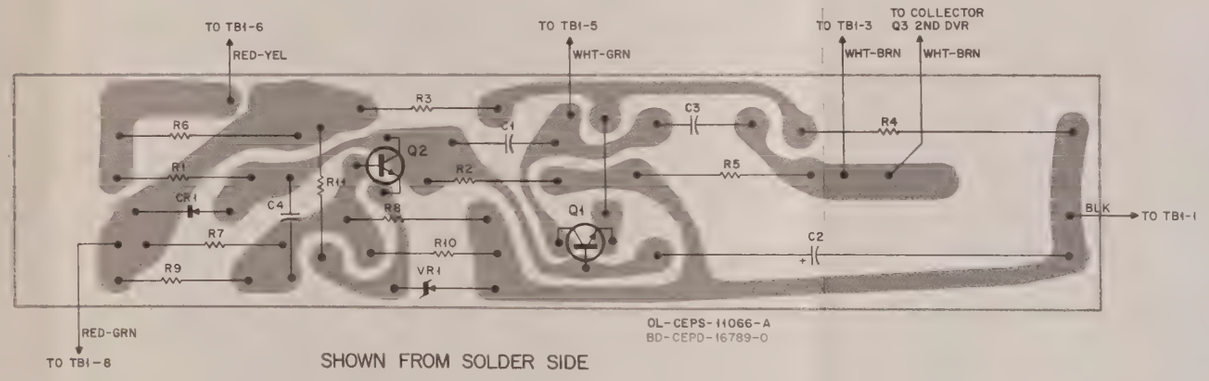


NOTES:

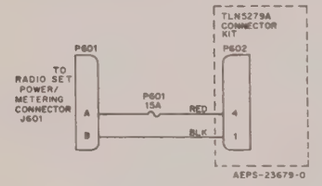
1. UNLESS OTHERWISE SPECIFIED, RESISTOR VALUES ARE IN OHMS.
2. CHASSIS PARTS ARE PART OF TRN6561A CHASSIS KIT
3. R9 AND R10 MAY BE OMITTED AT FACTORY

FLOATING GROUND — CHASSIS GROUND

4. VOLTAGES SHOWN ARE FOR A "NO-LOAD" CONDITION
5. CONNECTIONS SHOWN ARE FOR 121 V AC OPERATION ONLY TO CONVERT TO 220/240 V AC OPERATION:
   a. REPLACE P1 WITH 220/240 V AC PLUG
   b. REMOVE JU1.
   c. FOR 220 V AC OPERATION, DISCONNECT BLK/WHT LEAD FROM TB2-3 AND RECONNECT TO TB2-2
   d. FOR 240 V AC OPERATION, DISCONNECT BLK/WHT LEAD FROM TB2-3 AND RECONNECT TO TB2-1.



SHOWN FROM SOLDER SIDE



TPN1154A MODEL COMPLEMENT

UNIT	VER
TLN5274B REGULATOR BOARD	O
TLN6561A POWER SUPPLY CHASSIS	O
TLN5279A CONNECTOR KIT	O

EPS-23678-O

FUNCTION

Provides the entire radio with regulated +14.5 V DC when used in a 121 V AC primary power fixed installation.

UNIFIED CHASSIS

CIRCUIT BOARD DETAIL

PUSH-PIN TABLE

PIN/CT	WIRE COLOR	FUNCTION
		PL BOARD CONNECTIONS WHEN USED
C	RED WHT	SWITCHED A+ TO PL BOARD
D	WHT RED	PL TONE TO PL BOARD DECODER INPUT
E	YEL WHT	AUDIO TO PL BOARD HIGH PASS FILTER INPUT
F	YEL BLU	AUDIO FROM PL BOARD HIGH-PASS FILTER OUTPUT
G	GRAY	SQUELCH CONTROL FROM PL BOARD SQUELCH SWITCH
M	GRN/BRN	MIC PTT TO PL BOARD PTT INPUT
N	GRN WHT	DELAYED PTT FROM PL BOARD
P	BRN ORG	PL TONE FROM PL BOARD ENCODER OUTPUT
T	BLK	PL BOARD GROUND
		MICROPHONE CONNECTIONS
U	RED	AUDIO HIGH
V	BLK	AUDIO LOW
W	WHT	PTT GROUND
X	GRN	PTT

EPS-19728-O

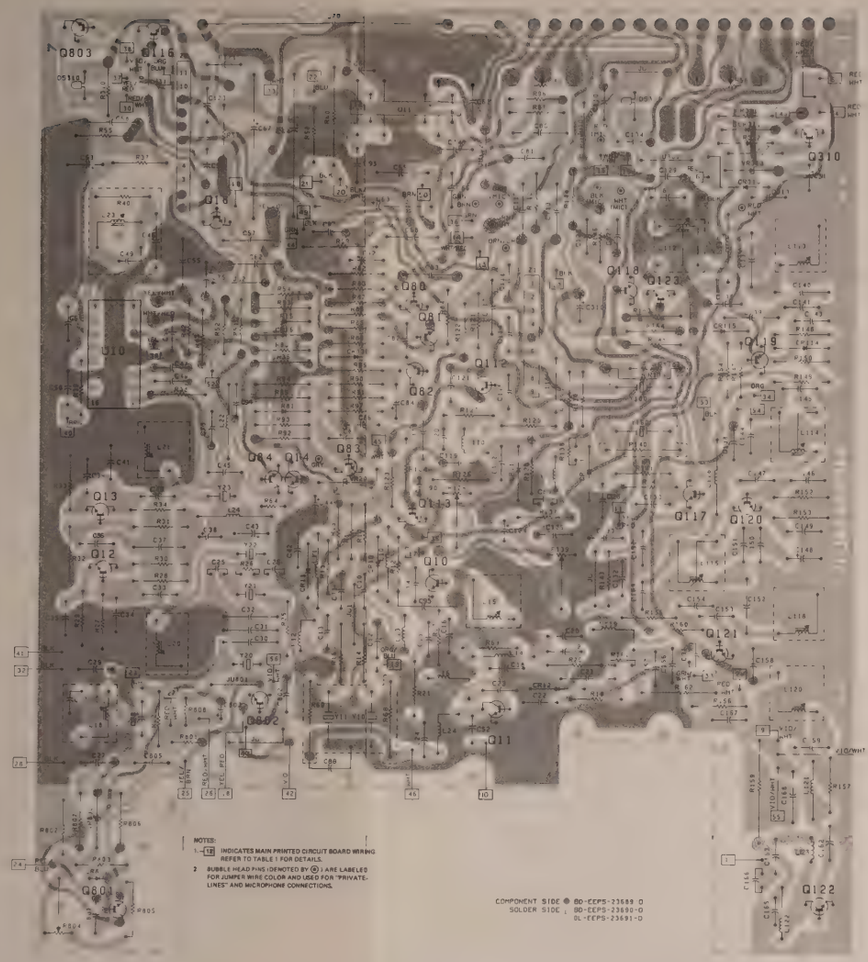
JUMPER TABLE

JUMPER NUMBER	IN	OUT
JU1-JU101	SINGLE-FREQUENCY RECEIVER MODELS	TWO-FREQUENCY RECEIVER MODELS
JU2-JU102	CARRIER-SQUELCH MODELS	PRIVATE-LINE SQUELCH MODELS
JU104	2PPM BASE STATION MODELS	5PPM MOBILE MODELS
JU301	NORMALLY 'A' FOR POWER-ON INDICATOR	EXTINGUISH POWER-ON INDICATOR OR USED WITH QUIK-CALL OPTION

EPS-23687-O

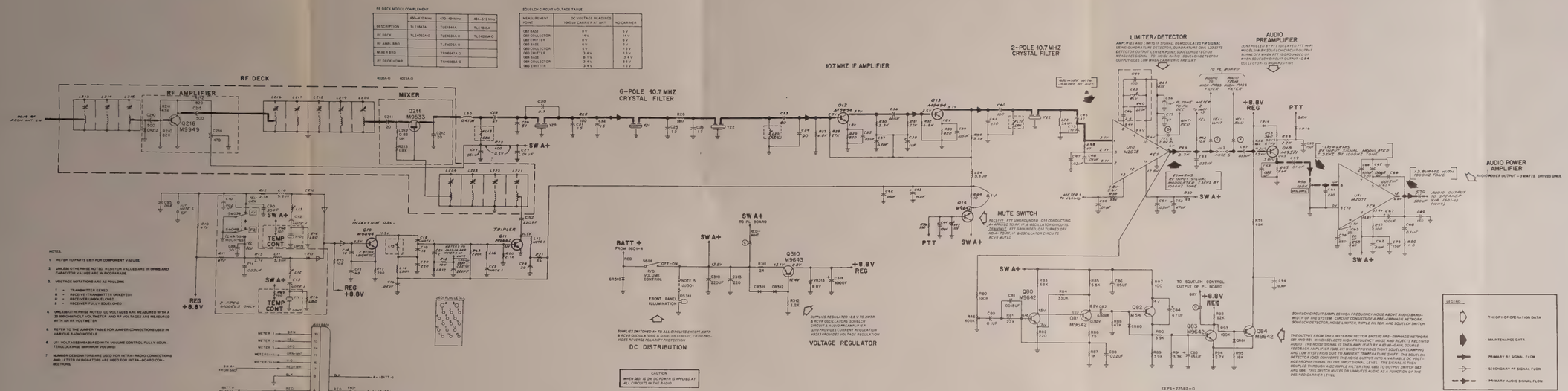
NO	FUNCTION	ON-BOARD SOURCE	COLOR	OFF-BOARD DESTINATION	REMARKS
1	RF INPUT TO TRIPLER FILTER	C163	---	C216	SLEEVED WIRE
2	SW A+	R158	RED-WHT*	---	FROM [5]
3	SW A+ TO Q801 VIA J801-7	R311	RED-WHT*	J801-7	
4	SW A+ TO Q803 EMITTER	R311	RED-WHT*	---	TO [30]
5	SW A+ TO RF AMP	R311	RED-WHT*	---	TO [7]
6	A+	CR310	RED	TO S311	
7					
8	DRIVER CONTROLLED A+	C188	VIO-WHT	Q801 COLLECTOR	
9	TO [30]	C188	VIO-WHT*	---	
10	RCVR INJECTION	C52		TO FRESELECTOR	SLEEVED WIRE
11	XMTR F2 SELECT	C133	YEL-RED	S804-A	
12	C310 GND	C310	BLK	---	TO [32] MODA7/TGT FOR ANTENNA SWITCH
13	PTT	C83	WHT-GRN	---	
14	PTT	J1102	WHT-RED*	C829	
15	F1 XMTR SELECT	C129	YEL-BLK	S803-A	
16	MIC AUDIO	C110	WHT-GRN*	TO J801-5	
17	RCVR F2 SELECT	C11	YEL-BLU	S804-B	F2 MODELS ONLY!
18		Q802 EMITTER	YEL-RED*	---	TO [31]
19	RCVR HEATERS	R158	ORG-BLU	---	FROM NO [31]
20	RCVR AUDIO	R80	BLK-WHT*	J801-9	
21	SPEAKER GND	C85	BLK*	J801	
22	SPEAKER AUDIO	R80	BLU*	J801	
23	RCVR AUDIO	C70	WHT*	J802-12	
24	THERMAL SHUTBACK	C801	RED-BLU*	TO C833	FEED THROUGH CAP
25	A+	R801	YEL-BRN*	TO F.N.A. PA	
26	A+	R808	RED-WHT*	DRIVER STAGE FINAL PA	
27	A+	R808	RED-WHT	FROM S801	
28	MIXER GND	C27	BLK	MIXER BOARD	
29	P1 AMP SW A+	R27	WHT	TO RF AMP BOARD	
30	SW A+	R310	RED-WHT*	---	FROM [4]
31	RCVR HEATERS	Z2-11	ORG-BLUE		TO [18]
32	C310 GND	C29	BLK		TO [12]
33	XMTR METER 5	R182	GRN-WHT	J801-11	
34	XMTR METER 3	R147	ORG	J801-14	
35	RCVR F1 SELECT	C80	YEL-GRN	S802-B	
36	PTT	J1102	GRN*	TO J801-8	
37	---	Q803 BASE	YEL-RED		TO [6]
38	TO 9	Q803 COLLECTOR	VIO-WHT*		
39	RCVR METER 2	R42	YEL*	J801-13	
40	RCVR METER 1	C60	BRN*	J801-10	
41	GND		BLK*	J801-6	
42	MTR 5	R801	VIO*	J801-15	
43	A+	CR311	RED-WHT	FROM S801	
44	XMTR GND	Q81	GRN	FREQUENCY SWITCH	
45	RCVR HEATER JUMPER	Q87	WHT*		TO [46]
46	RCVR HEATER JUMPER	R88	WHT*	---	FROM [45]
47	INHIBIT	Q802 BASE	BRN-YEL	---	
48	A+	R57	RED-WHT	---	
49	GND	Q87	BLK	---	
50	TONE	C85	BRN	---	
51	---	---	---	---	
52	DISCRIM OUTPUT	R42	YEL	MODAT	
53	GND		BLK	MODAT	
54	DISCR AUDIO W/R2	R147	ORG	MODAT	
55	TRIPLER CONTROL VOLTAGE	R158	VIO-WHT*	---	TO [56]
56	TRIPLER CONTROL	Q802 COLLECTOR	VIO-WHT*	---	TO [55]
57			---	---	
58		---	---	---	
59					

* P/O WIRING HARNESS



FUNCTION

Amplifies, mixes, filters, and demodulates received rf energy from antenna (via antenna switch) and provides an amplified audio signal to the speaker.



RF DECK MODEL COMPLEMENT

	150–174 MHz	470–494MHz	494–512 MHz
DESCRIPTION	TLE1843A	TLE1844A	TLE1845A
RF DECK	TLE4033A-O	TLE4034A-O	TLE4035A-O
RF AMPL BRD		TLE4031A-O	
MIXER BRD		TRN8874A-O	
RF DECK HDWR		TRN8858A-O	

SQUELCH CIRCUIT VOLTAGE TABLE

MEASUREMENT POINT	DC VOLTAGE READINGS 1000 µV CARRIER AT ANT	NO CARRIER
Q80 BASE	0 V	5 V
Q80 COLLECTOR	1 V	8 V
Q81 EMITTER	0 V	9 V
Q81 BASE	0 V	9 V
Q81 COLLECTOR	5 V	13 V
Q83 EMITTER	3.4 V	13 V
Q84 BASE	8.1 V	3.4 V
Q84 COLLECTOR	3.4 V	8.8 V
Q86 EMITTER	3.4 V	13 V

NOTES:
1. REFER TO PARTS LIST FOR COMPONENT VALUES.
2. UNLESS OTHERWISE NOTED: RESISTOR VALUES ARE IN OHMS AND CAPACITOR VALUES ARE IN PICOFARADS.
3. VOLTAGE NOTATIONS ARE AS FOLLOWS:
   T = TRANSMITTER KEYED
   R = RECEIVER UNSQUELCHED (OR UNKEYED)
   U = RECEIVER UNSQUELCHED
   S = RECEIVER FULLY SQUELCHED
4. UNLESS OTHERWISE NOTED, DC VOLTAGES ARE MEASURED WITH A 20 000 OHM/VOLT VOLTMETER AND RF VOLTAGES ARE MEASURED WITH AN RF VOLTMETER.
5. REFER TO THE JUMPER TABLE FOR JUMPER CONNECTIONS USED IN VARIOUS RADIO MODELS.
6. VOL VOLTAGES MEASURED WITH VOLUME CONTROL FULLY COUNTERCLOCKWISE (MINIMUM VOLUME).
7. NUMBER DESIGNATORS ARE USED FOR INTRA–RADIO CONNECTIONS AND LETTER DESIGNATORS ARE USED FOR INTRA–BOARD CONNECTIONS.

68P81034E83-0
(Sheet 2 of 4)
3/18/77-VG

RADIO SET PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
TLE4003A	Main Board. 1-Freq. (450-470 MHz)	
TLE4013A	Main Board. 2-Freq. (450-470 MHz)	
TLE4034A	Main Board. 1-Freq. (470-494 MHz)	
TLE4024A	Main Board. 2-Freq. (470-494 MHz)	
TLE4705A	Main Board. 1-Freq. (494-512 MHz)	
TLE4715A	Main Board. 2-Freq. (494-512 MHz)	PL-5393-O

NOTE: This parts list covers six models of the Main Board. Where differences exist, a letter code is added to the reference symbol to indicate the frequency range of the applicable unit. A notation in the Description column indicates when the unit is a 2-frequency model.

		CAPACITOR: fixed; pF ±5%, 500V unless otherwise stated
C102,11	2-82428B25	.002 pF ±20% (2-Freq.)
C12C	2-82429B15	24
C12M,H	2-82422AB51	15
C13C	2-82391B15	24 (2-Freq.)
C13M,H	2-82424B51	18 (2-Freq.)
C14	2-82393C07	18
C15	2-82609C30	68, 200V
C16	2-82427C04	.05 pF +80-20%, 25V
C17	2-84008H07	.05± pF ±10%, 100V (attached to L18)
C18C	2-82610C13	20; 200V
C18M	2-84040D78	18
C18H	2-84079C94	15 ±10%, 250V
C19	2-84626D76	19
C20	2-84596E10	220 ±20%
C21	2-84596E10	220
C22	2-84596E10	220 ±20%
C23	2-84693B74	4.25 ±0.25 pF
C23M,H	2-84040D78	3 ±0.25 pF
C24	2-8496A6	20
C25 2e	2-82450B51	3.5
C27	2-82428P04	.01 pF +30-70%, 100V
C28	2-82428B09	47, 100V
C29	2-82428B61	51, 200V
C30	2-82459B26	0.1 ±10%
C31,32	2-82459B15	1.5
C33	2-82504B49	68, 100V
C34	2-82428B68	90, 100V
C35	2-82372C04	.05 pF +80-20% 25V
C36	2-82387B20	.001 pF ±10%, 100V
C37	2-82372C04	.01 pF +80-20% 25V
C38	2-84603B15	1000pF ±10%, 100V
C39	2-821 C04	.05 pF +80-20% 25V
C40	2-83798B01	100, 200V
C41	2-84483B24	1.5
C42	2-82372C04	.05 pF +80-20% 25V
C43	2-84533C04	15 pF ±20%, 20V
C44	2-84603B74	47 pF ±10%, 100V
C45	2-82554B40	47, 100V
C46	2-82473B14	2.4
C47	2-82428B2E	.02 pF +20-80% 200V
C48	2-82428B19	.01 pF +20-80% 200V
C49	2-82358C12	1000, 100V (attached to L23)
C40M	2-82428B59	.01 pF -20-80% 200V
C40H	2-82313C19	.05 pF +80-20% 25V
C41	2-82204B54	220 ±20%
C42		not used
C43	2-82428B59	.01 pF +30-70% 100V
C44,145	2-82372C04	.05 pF +80-20% 25V
C146,L,M	2-82204B54	150; 200V
C146H	2-82610C44	100, 100V
C147,L	2-82610C03	47, 200V
C147H	2-83405D42	43
C148	2-84533C04	15 pF ±20%, 20V
C149,150	2-83596E10	200 ±20%
C151L	2-83405D14	8 ±0.5 pF
C151M	2-82313G14	7.5 ±0.5 pF
C151H	2-82133G26	9 ±0.5 pF
C152	2-82450B29	0.51
C153L	2-82133G21	10 ±0.5 pF
C153M	2-83405D94	9 ±0.5 pF
C153H	2-82133G22	8 ±0.5 pF
C154	2-82133G41	4.7 ±0.25 pF
C155		not used
C156	2-83596E10	220 ±20%

C157	2-82372C04	.05 pF +80-20%, 25V
C158L,M	2-84493B31	57; 200V
C158H	2-8340D56	24
C159L	2-82204B33	5 ±0.25 pF
C159M	2-83406D80	4.7 ±0.25 pF
C159H	2-82204B33	5 ±0.5 pF
C160,161		not used
C162	2-8340D56	24
C163L	2-83406D64	5.6 ±0.25 pF
C163M	2-8340bD80	4.7 ±0.25 pF
C163H	2-84493B54	4.25 ±0.25 pF
C164		not used
C165	2-82877B24	220 ±10%, 75V
C166L,M	2L-867807	8 ±5%, 75V
C166H	2L-861428	5 ±10%, 75V
C167	2L-82428B04	.01 pF -30+70%, 100V
C168	2L-84583E06	47 pF ±20%, 20V
C169	2L-82877B34	150 ±10%, 50V
C170,171	2L-8340bD77	30
C180 thru 84	2L-84665F06	220 pF -0+150% 25V
C311	2L-84665F03	100 pF -0+100% 25V
C312,313	2L-83596E10	220 ±20%
C314,315	2L-8340bD77	30 ±5%
C803	2L-84665F01	10 pF-0+100% 25V
C804		not used
C805	2L-8340bD77	30

DIODE: (See Note I)

CR10	48-835103F03	silicon
CR11	48-835103F03	silicon (2-Freq.)
CR12	48-82139C01	germanium
CR13,14		not used
CR15,16	48-8365A4H01	silicon
CR80,81	48-8365A4H01	silicon
CR110	48-82190H13	silicon
CR111	48-82190H13	silicon (2-Freq.)
CR112,113		not used
CR114	48-8365A4H01	silicon
CR115	48-82139C01	germanium
CR310	48-82525G13	silicon
CR311,312	48-83b54H01	silicon
CR801	48-8246bH13	silicon

CONNECTOR, plug:
Includes:
HOUSING, connector: 17 contact
CONTACT, female,: .865" long; 2 used
CONTACT, female,: .660" long; 10 used

J601	29-84706E06	
	15-83957L01	
	29-82336A01	

COIL, rf:

L1 thru 9		not used
L10	24-82835G20	9.3 uH (2-Freq.)
L11	24-82835G20	9.3 uH (2-Freq.)
L12	24-83601H01	18-1/2 turns (2-Freq.)
L13	24-83601K01	18-1/2 turns
L14	24-82723H03	23 uht
L15	24-84692A81	2-1/2 turns; coded yellow
L16	24-83884G03	1-1/2 turns; coded brown
L17	24-83884G06	4-1/2 turns; coded white
L17H	24-83884G01	3-1/2 turns; coded red
L18	24-84419D03	33-1/2 turns; coded green (attached to C17)
L19	24-84419D04	not used
L20,21	24-84419D03	33-1/2 turns; coded green
L22	24-84419D61	5.6 uH
L23	24-84419D04	23-1/2 turns; coded blue (attached to C49)
L24	24-82835G20	9.3 uH
L25 thru 29		not used
L30	24-82721H05	0.41 uH
L110	24-83601K01	18-1/2 turns
L111	24-83601K01	18-1/2 turns (2-Freq.)
L112	24-84972A06	8-1/2 turns; coded orange
L113	24-84972A04	8-1/2 turns; coded white
L114	24-84972A07	8-1/2 turns; coded red
L115	24-84972A26	3-1/2 turns; coded blue
L116	24-82835G13	0.82 uH

L117	24-82135C08	620 uH
L118	24-84972A11	3-1/2 turns: coded black
L119	24-83884C08	5-1/2 turns: coded orange
L120	24-83885C09	2-1/2 turns; coded brown
L121	24-83961B01	3 turns; coded brown
	24-82723H25	.033 uH
L121	24-84881C04	1-1/4 turns
Q10	48-84N4A4	TRANSISTOR: (See Note I) NPN: type M9464
	or	
	48-86-9912	NPN: type M9932
Q11		NPN: type M9662
Q12,13	48-8694A4	NPN: type M9494
	or	
	48-86932	NPN: type M9932
	48-8694A2	NPN: type M9642
Q14	48-8694A2	not used
Q15 thru 17		not used
Q18	48-8695L1	NPN: type M9571
Q80 thru 84	48-8694A2	NPN: type M9642
Q112	48-8694A3	PNP: type M9643
Q113	48-8694A2	NPN: type M9642
Q114, 115		part of Z2
Q117	48-8694A4	NPN: type M9494
	or	
	48-86932	NPN: type M9932
	48-8694A4	NPN: type M9494
	or	
	48-86932	NPN: type M9932
Q120	48-86936	NPN: type M9638
Q121	48-8695T7	NPN: type M9571
Q123	48-8694A3	PNP: type M9643
Q124,125,126		part of Z3
Q310	48-8694A3	PNP: type M9643
Q801,802	48-8694A3	PNP: type M9643
Q804	48-8694A3	PNP: type M9643

RESISTOR, fixed: ±10%; 1/4W unless otherwise stated
not used

R1 thru 9		
R10	6-124AB9	47k ±5%
R11	6-124AB4	47k ±5% (2-Freq.)
R12	6-124C79	2.7k
R13	6-124C59	2.7k (2-Freq.)
R14	6-124C59	680
R15	6-124C78	10k
R16	6-124C40	680 (2-Freq.)
R17	6-124C79	390
R18	6-124C78	10k
R19		not used
R20	6-124C59	2.7k
R21	6-124C17	56
R22	6-124C23	100
R23,24		not used
R25,26	6-124A34	180 ±5%
R27	6-124C39	6.8k
R28	6-124C68	271
R29	6-124C47	820
R30	6-124C34	3.3k
R31	6-124C83	27k
R32	6-124C69	6.8k
R33	6-124C47	820
R34	6-124C63	3.3k
R35		not used
R36	6-124C39	390
R37	6-124C13	33
R38	6-124C17	47
R39	6-124C83	33k
R40	6-124D06	220k
R41	6-124A89	47k ±5%
R42	6-124C73	10k
R43	6-124C59	2.7k ±5%
R44,45		not used
R47 thru 50		not used
R51	6-124A97	62k ±5%
R52	6-124A78	16k ±5%
R53	6-124C43	560
R54	6-124C57	2.2k
R55	6-124A67	5.6k ±5%
R57	6-124C25	100

R58	6-124A17	47 ±5%
R59	6-125B70	1 ±5%; 1/2W
R60	17-82036C13	0.75 ±5%; 2W
R61,62		not used
R63	6-124D06	220k
R64	6-124C01	10
R65 thru 67		not used
R68	6-125A25	100 ±5%; 1/2W
R69	6-125A25	100 ±5%; 1/2W (2-Freq.)
R80	6-124C97	100k
R81	6-124A81	22k ±5%
R82	6-124C31	220k
R83	6-124C93	68k
R84	6-124D10	330k
R85	6-124A67	5.6k ±5%
R86	6-124A22	75 ±5%
R87	6-124A49	1k ±5%
R88	6-124C89	47k
R89,90	6-124C63	3.9k
R91	6-124C61	3.3k
R92	6-124A92	62k ±5%
R93	6-124A97	100k ±5%
R94	6-124C59	2.7k
R95	6-124A79	18k ±5%
R96	6-124B04	180k ±5%
R97	6-124C25	100
R98 thru 109		not used
R110	6-124C43	560
R111 thru 119	6-124C43	not used
R120	6-124A76	13k ±5%
R121,122	6-124A71	8.2k ±5%
R123	6-124C59	2.7k
R124	6-124A71	8.2k ±5%
R125	6-124C59	2.7k
R126	8-84944C02	variable: 25k ±20%; 0.1W
R127	6-124C67	5.6k
R128	6-124B02	150k ±5%
R129	6-124B04	180k ±5%
R130 thru 134		not used
R135	6-125A25	100 ±5%; 1/2W
R136	18-84944C02	variable: 25k ±20%; 0.1W (2-Freq.)
R137	6-124C67	5.6k (2-Freq.)
R138	6-124B02	150k ±5%; (2-Freq.)
R139	6-124B04	180k ±5% (2-Freq.)
R140	6-125A25	100 ±5%; 1/2W (2-Freq.)
R141	6-124A65	4.7k ±5% (2-Freq.)
R142	6-124C73	12k (2-Freq.)
R143	6-124A49	1k ±5% (2-Freq.)
R144	6-124A65	4.7k ±5%
R145	6-124C73	12k
R146	6-124A49	1k ±5%
R147	6-124A73	10k ±5%
R148	6-124A67	5.6k ±5%
R149	6-124A83	27k ±5%
R150	6-124A19	56 ±5%
R151		not used
R152	6-124C33	220
R153	6-124A29	100 ±5%
R154	6-124C29	120
R155	6-124A33	220 ±5%
R156	6-124B61	4.7 ±5%
R157	6-124A17	47 ±5%
R158		not used
R159	17-83122D09	22 ±5%; 3W
R160	6-124A63	3.9k ±5%
R161	6-124A33	220 ±5%
R162	6-125A11	47 ±5%; 1/2W
R163	6-124A37	330 ±5%
R164	6-124A59	2.7k ±5%
R310	6-124C53	1.5k
R311	6-124A10	24 ±5%
R312	6-124C51	1.2k
R801	17-82036C48	0.1 ±5%; 2W
R802	6-125C23	82; 1/2W
R803	6-124A49	1k ±5%
R804	18-84944C01	variable: 2k ±20%; 0.1W
R805	6-124A49	1k ±5%
R806	6-124A17	47 ±5%
R807	6-124A49	1k ±5%

R808	17-80236C48	0.1 ±5%; 2W
RT101	6-83600K01	THERMISTOR: 1k @ 25°C
S601		SWITCH:
S602,603,604	40-83290K01	part of R56
S602	40-83290K02	3-dpdt ("PL" & 2-Freq.)
S603,604	40-83290K03	1-dpdt ("PL")
		4-dpdt (Main Board)
U10	51-84320A78	INTEGRATED CIRCUIT: (See Note I)
U11	51-84320A77	type M2078
		type M2077

Not part of main board

DIODE (See Note I)

VR2	48-82256C50	Zener; 15V
VR313	48-82256C56	Zener; 8.5V
VR802	48-82256C56	Zener; 8.5V

CRYSTAL UNIT: (See Note II)

Y10	--	KXN6122AA
Y11	--	KXN6122AA (2-Freq.)
Y20	48-84396K-5	10.7 MHz
Y21	48-84574K03	10.7 MHz
Y22	48-84396K02	10.7 MHz
Y23	48-84574K01	10.7 MHz
Y100	--	KXN6124AA
Y160	--	KXN6121AA

HYBRID CIRCUIT:

Z1	51-84333C80	audio ampl./IDC limiter
Z2	51-84333C83	temperature regulator: 5 PPM
	51-84333C82	temperature regulator: 2 PPM

NON-REFERENCED ITEMS

1-8078858	HEAT SINK ASSEMBLY includes: INSULATOR, transistor HEAT SINK TRANSISTOR Q121
14-861196	CABLE ASSEMBLY
26-84716D01	includes:
1-80794B80	STRAP, tie; 11 used
76-83960B01	CORE, ferrite: 3 used CAPACITOR C312 CONNECTOR J601
1-80794B81	CIRCUIT BOARD ASSEMBLY includes: CONTACT, plug: 17 used
39-10184A10	GROMMET (plastic)
5-10277A71	SOCKET, lamp: .312" x .870"
9-83396K02	SOCKET, lamp: .312 x .562"
9-83396K03	SOCKET, crystal: 4-contact; 2 used
26-82048L01	SHIELD, coil: .510 x .510 x .780"
26-82570L01	HEAT SINK: .320 x .100 x .590
26-83264F01	SHIELD, coil: .735 x .735 x 1.05"
26-84161L01	SHIELD, oscillator
26-84170L01	SHIELD
26-84171L01	SHIELD
26-84598A01	SHIELD, coil: .510 x .510 x .960" (.300" hole); 6 used
26-84598A02	SHIELD, coil: .510 x .510 x .960" (.250" hole); 3 used

NOTE I: For optimum performance, diodes, transistors and integrated circuits must be ordered by Motorola part numbers.

II: When ordering quartz crystal units or ceramic resonators, specify carrier frequency, crystal (or resonator) frequency and crystal (or resonator) type number.

REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
TRN8850A	PA Hardware Kit (450-470 MHz)	
TRN8851A	PA Hardware Kit (470-494 MHz)	
TRN8852A	PA Hardware Kit (494-512 MHz)	

LEGEND

L = 450-470 MHz
M = 470-494 MHz
H = 494-512 MHz

PL-5386-O

NOTE: This parts list covers three models of the PA Hardware Kit. Where differences exist a letter code is added to the reference symbol to indicate the applicable frequency range.

		CAPACITOR, fixed; pF ±5%, 850V unless otherwise stated
C605L	21-82122K11	65
C605M	21-82122K10	60
C605H	21-82122K09	55
C606	21-82122K05	34
C609	21-82122K08	50
C611	21-82122K05	34
C612L	21-82122K08	50
C612M	21-82122K03	44
C612H	21-82122K02	40
C624	21-83368K06	10 ±0.25pF; 1700V
C625,626	21-83366K07	32; 1700V
C627	21-83366K06	10 ±0.25pF; 1700V

CONNECTOR, receptacle

J602	9-82442E06	single contact

TRANSISTOR: (See Note I)

Q601	48-869888	NPN; type M9888
Q602	48-869851	NPN; type M9851
Q603L	48-86941	NPN; type M9741
Q603M,H	48-869950	NPN; type M9950

RESISTOR, fixed:

R606	6-125C97	100k ±5%; 1/2W

SENSOR, thermal

RT601	6-83385L02	2.5k @ 88°C
CR601,602	48-83510F05	DIODE: (See Note) silicon

COIL, rf:

L601	24-83961B01	3 turns, coded brown
L602	24-83884G03	1 1/2 turns, coded brown
L603	24-83961B01	3 turns, coded brown
L604	24-82723H05	0.41 uH, coded yellow
L605		part of circuit board platiog
L606	24-83884G03	1 1/2 turns, coded brown
L607	24-82723H05	0.41 uH, coded yellow
L608	24-83884G03	1 1/2 turns, coded brown
L609, 610	24-82723H01	1.2 uH
L611	42-84438K02	fixed wire loop

TRANSISTOR: (See Note)

Q604	48-869643	PNP; type M9643

RESISTOR, fixed; ±5%; 1/4W unless otherwise stated

R601	6-124AD7	18
R602	6-124A01	10
R603	6-124D55	2.7 ±10%
R604	6-125C47	820 ±10%; 1/2 W
R605	6-124C59	2.7k ±10%
R607	6-124A68	6.2k
R608	6-124A39	390
R609	18-84944C04	variable: 500±20%; 0.1W

NON-REFERENCED ITEMS

1-80785B95	CABLE ASSEMBLY, receiver includes:
30-859004	CABLE, coaxial; 6.88" long
37-82603D60	SLEEVE, numbered: blank
42-82999L01	CLIP; .407" long
1-80786B98	CABLE ASSEMBLY includes:
30-859004	CABLE, coaxial; 9.63" long
42-82999L01	CLIP; .407" long

REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
TLE8973A	Power Amplifier Board (450-470 MHz)	
TLE8974A	Power Amplifier Board (470-494 MHz)	
TLE8975A	Power Amplifier Board (494-512 MHz)	

LEGEND

L = 450-470 MHz
M = 470-494 MHz
H = 494-512 MHz

PL-5387-O

NOTE
This parts list covers three models of the Power Amplifier Board. Where differences exist a letter code is added to the reference symbol to indicate the applicable frequency range.

		CAPACITOR, fixed; pF ±5%, 500V unless otherwise stated
C401	21-83406D54	4
C602L	21-83406D95	14
C602M	21-83406D90	11
C602H	21-83406D89	10 ±0.5pF
C603	21-83406D77	30
C604		not used
C607	20-84882C03	variable; 0.6-19.8; 63 V
C608		not used
C610L	21-83740D05	12
C610M,H	21-83740D04	10 ±0.5pF
C613	20-83201B11	variable; 1.5-18; 100V
C614	21-83406D87	43
C615	20-83201B11	variable; 1.5-18; 100V
C616	23-82601A31	15 uF -10 +150%, 25V
C617	21-82372C10	.05uF ±20%, 25V
C618		not used
C619	21-82372C10	.05uF ±20%, 25V
C620	23-8260A31	15uF -10 +150%, 25V
C621	21-82428B08	.02uF -40 +10%, 100V
C622	21-84494B38	15; 500V
C623	21-82428B04	.01uF -30 +70%, 100V
C628L	21-82877B46	18 ±10%, 75V
C628M	21-82358G75	15.5 ±2%; 25V
C628H	21-82358G78	14.3 ±2%; 25V
CR601,602	48-83510F05	DIODE: (See Note) silicon

COIL, rf:

L601	24-83961B01	3 turns, coded brown
L602	24-83884G03	1 1/2 turns, coded brown
L603	24-83961B01	3 turns, coded brown
L604	24-82723H05	0.41 uH, coded yellow
L605	24-83884G03	part of circuit board platiog
L606	24-83884G03	1 1/2 turns, coded brown
L607	24-82723H05	0.41 uH, coded yellow
L608	24-83884G03	1 1/2 turns, coded brown
L609, 610	24-82723H01	1.2 uH
L611	42-84438K02	fixed wire loop

TRANSISTOR: (See Note)

Q604	48-869643	PNP; type M9643

RESISTOR, fixed; ±5%; 1/4W unless otherwise stated

R601	6-124AD7	18
R602	6-124A01	10
R603	6-124D55	2.7 ±10%
R604	6-125C47	820 ±10%; 1/2 W
R605	6-124C59	2.7k ±10%
R607	6-124A68	6.2k
R608	6-124A39	390
R609	18-84944C04	variable; 500±20%; 0.1W

NON-REFERENCED ITEMS

1-80785B95	CABLE ASSEMBLY, receiver includes:
30-859004	CABLE, coaxial; 6.88" long
37-82603D60	SLEEVE, numbered: blank
42-82999L01	CLIP; .407" long
1-80786B98	CABLE ASSEMBLY includes:
30-859004	CABLE, coaxial; 9.63" long
42-82999L01	CLIP; .407" long

REFERENCE SYMBOL	MOTOROLA PART NO	DESCRIPTION
TMN6104A	Microphone	PL-3351-O
DP601	59-82933C02 or 59-82933C01	CARTRIDGE, microphone: preamplifier dynamic: includes transistor
W601	30-82565B34	CORD, microphone: coiled 4-conductor; includes 39-10184A24 TERMINAL, PIN; female; 16 awg/ 4, 41-85707 SPRING, strain relief; 29-83277O02 LUG; 4 req'd,
S604	40-82263G02	SWITCH, push: dpst

NON-REFERENCED ITEMS

33-82599D01	NAMEPLATE
13-84599B01	EMBLEM
38-84559B01	PUSHBUTTON
3-132436	SCREW, machine: No. 6-32 x 13/16"; 3 req'd,
4-7669	WASHER, lock: No. 6 split; 3 req'd,
4-141001	WASHER, flat: 1/4" x 0.156" x 0.015"; 3 req'd,
1-80709B93	HOUSING, microphone (rear)
3-124948	SCREW, lock: No. 8-32 x 5/16" "Phillips" round head
4-7666	LOCKWASHER: No. 6 external
42-852710	STRAP, strain relief
3-124693	SCREW, lock: No. 6-32 x 1/4 "Phillips" round head; 2 req'd,
15-82701B12	COVER, microphone (front)
42-82702B02	RETAINER, cartridge
32-82703B01	GASKET, neoprene

TRN6660A	Rf Deck Hardware Kit	PL-5391-O
	1-80748B42	COVER ASSEMBLY, 3-cell 2 used, includes
	2-84773E04	NUT, tension; 3 used
	3-84589G01	SET SCREW: 5-40 x 7/16 3 used
	15-84396G01	COVER, 3-cell
	1-80748B43	COVER ASSEMBLY, 4-cell includes:
	2-84773E04	NUT, tension: 4 used
	3-84589G01	SET SCREW: 5-40 x 7/16 4 used
	15-84394G01	COVER, 4-cell
	1-80748B44	COVER ASSEMBLY, 5-cel: includes:
	2-84773E04	NUT, tension: 5 used
	3-84589G01	SET SCREW: 5-40 x 7/16 5 used
	15-84397G01	COVER, 5-cell
	3-138028	SCREW, machine: 2-56 x 5/32 25 used
	4-474216	WASHER, insulating
	15-84409K01	COVER, rf
	29-5324	LUG, solder; .037" wire hole
	29-134245	LUG, solder; .046" wire hole; 3 used

TRN6874A	Mixer Board	PL-5392-O
C211,212	21-82877B12	CAPACITOR, fixed; 20 pF ±5%, 75V
L212	24-82723H17	COIL, rf; 0.82 uH
Q211	48-869533	TRANSISTOR: (See Note) FET; type M9533
R213	6-185B82	RESISTOR, fixed; 1.8k ±10%, 1/8 W

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

TLE4033A Rf Deck (450-470 MHz)
TLE4034A Rf Deck (470-494 MHz)
TLE4035A Rf Deck (494-512 MHz)

LEGEND

L = 450-470 MHz
M = 470-494 MHz
H = 494-512 MHz PL-5390-O

NOTE: This parts list covers three models of the RF Deck. Where differences exist a letter code is added to the reference symbol to indicate the applicable frequency range.

		CAPACITOR, fixed:
C214	21-84760C01	470 pF ±20%; 500V(fed thru type)
C216L, M	21-82785H56	5 pF ±0.5 pF; 1700V
C216H	21-83366K08	4 pF ±0.5 pF; 1700V
		COIL, rf:
L213L	1-80748B40	8 turns; coded orange
L213M	1-80766B07	7-5/8 turns; coded brown-purple
L213H	1-80766B16	7-1/2 turns; coded red-orange
L214L	24-84641G01	8 turns; coded black
L214M	24-84641G20	7-5/8 turns; coded red-black
L214H	24-84641G25	7-1/2 turns; coded red-green
L215L	1-80748B40	8 turns; coded orange
L215M	1-80766B07	7-5/8 turns; coded brown-purple
L215H	1-80766B16	7-1/2 turns; coded red-orange
L216L	1-80748B41	8 turns; coded red
L216M	1-80766B08	7-5/8 turns; coded brown-blue
L216H	1-80766B17	7-1/2 turns; coded red-red
L217L	24-84641G01	7-5/8 turns; coded black
L217M	24-84641G20	7-5/8 turns; coded red-black
L217H	24-84641G25	7-1/2 turns; coded red-green
L218L	24-84641G01	7-5/8 turns; coded black
L218M	24-84641G20	7-5/8 turns; coded red-black
L218H	24-84641G25	7-1/2 turns; coded red-green
L219L	24-84641G01	7-5/8 turns; coded black
L219M	24-84641G20	7-5/8 turns; coded red-black
L219H	24-84641G25	7-1/2 turns; coded red-green
L220L	1-80748B41	8 turns; coded red
L220M	1-80766B08	7-5/8 turns; coded brown-blue
L220H	1-80766B17	7-1/2 turns; coded red-red
L221L	24-84641G26	8 turns; coded blue-blue
L221M	24-84641G27	7-3/4 turns; coded blue-white
L221H	24-8464G29	7-5/8 turns; code blue-gray
L222L	24-84641G01	8 turns; coded black
L222M	24-84641G14	7-3/4 turns; coded brown-yellow
L222H	24-84641G20	7-5/8 turns; coded red-black
L223L	24-84641G01	8 turns; coded black
L223M	24-84641G14	7-3/4 turns; coded brown-yellow
L223H	24-84641G20	7-5/8 turns; coded red-black
L224L	1-80748B46	8 turns; coded brown
L224M	1-80766B10	7-5/8 turns; coded brown-blue
L224H	1-80766B19	7-5/8 turns; coded red-brown
L225L	1-80748B40	8 turns; coded orange
L225M	1-80776B07	7-5/8 turns; coded brown-purple
L225H	1-80766B16	7-1/2 turns; coded red-orange
L226L	24-84641G01	7-5/8 turns; coded black
L226M	24-84641G20	7-5/8 turns; coded red-black
L226H	24-84641G25	7-1/2 turns; coded red-green
L227L	1-80748B40	8 turns; coded orange
L227M	1-80766B07	7-5/8 turns; coded brown-purple
L227H	1-80766B16	7-1/2 turns; coded red-orange
	NON-REFERENCED ITEMS	
	1-80796B92	HOUSING ASSEMBLY includes:
	15-84402K03	HOUSING
		CAPACITOR C214
	3-1465	SCREW, machine: 4-40 x 3/16"; 15 used
	14-84886A01	INSULATOR, standoff: 2 used

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

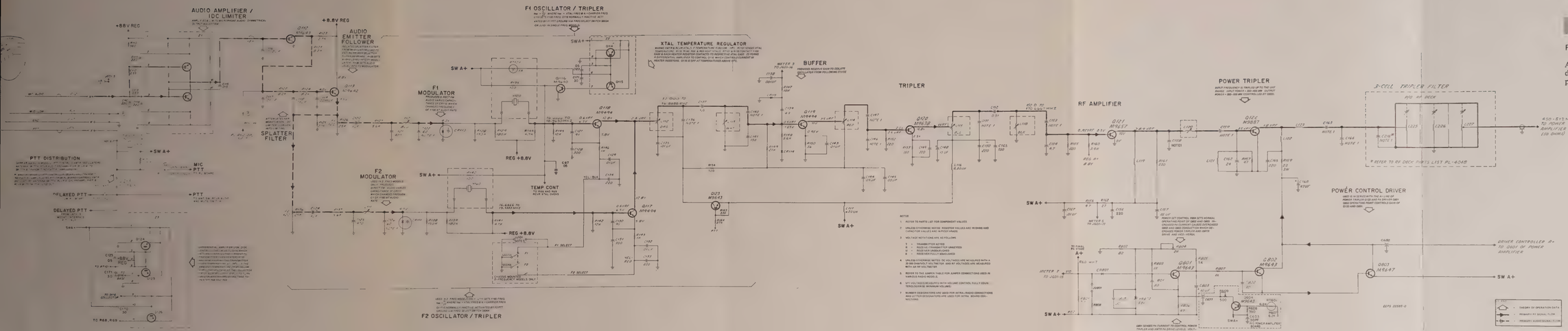
TRN6846A Hardware Kit, Main Board PL-5394-O

		CAPACITOR, fixed:
C629 thru 633	21-861219	1000 pF +100-0%; 500V (feed thru type)
		LAMP:
DS310, 311	65-83376K01	14V
		TRANSISTOR: (See Note)
Q116	48-869640	NPN; type M9640
Q122	48-869887	NPN; type M9887
Q803	48-869647	PNP; type M9647
		RESISTOR, variable:
R46	18-83287K01	100k ±30%; 1/4 W
R56	18-83288K01	100k ±30%; 1/4 W (includes S601)
	NON-REFERENCED ITEMS	
	1-80785B73	TRIPLER ASSEMBLY: includes
	14-861196	INSULATOR, transistor
	26-84411K01	HEAT SINK
		TRANSISTOR Q122
	1-80794B88	CAPACITOR ASSEMBLY, feed thru includes:
	7-83134K01	BRACKET, mounting
	27-83980L01	CHASSIS
		CAPACITORS C629 thru C633
	2-10054A74	NUT, spring: 6-32
	3-134185	SCREW, tapping: 6-32 x 1/4"
	3-134186	SCREW, tapping: 6-32 x 5/16"; 5 used
	3-134212	SCREW, tapping: 4-40 x 5/16"; 2 used
	3-135506	SCREW, tapping: 6-32 x 1/4"; 2 used
	3-138028	SCREW, tapping: 2-56 x 5/32"; 4 used
	14-83094L01	INSULATOR, transistor: .300 x .500"
	14-84268A01	INSULATOR, transistor: .520 x .660"
	14-84849K01	INSULATOR, coaxial cap: 2 used
	15-84403K01	COVER, coaxial: 2 used
	15-84410K01	COVER, mixer
	22-10133A19	PIN: .250 x .125"; 2 used
	26-82571L01	HEAT SINK
	26-83294K01	SHIELD: .990 x 1.930"
	26-83336L01	SHIELD, receiver
	26-84604K02	SHIELD, power amplifier
	26-84848K01	SHIELD, tripler: 1.750 x .205"
	29-5294	LUG, soldering: #6
	42-10217A02	STRAP, cable harness

TLE4023A Rf Amplifier Board PL-5389-O

		CAPACITOR, fixed:
C210, 215	21-847065	500 pF -0 +100%; 25V
		DIODE: (See Note)
CR212	48-83654H01	silicon
		TRANSISTOR: (See Note)
Q216	48-869949	NPN; type M9949
		RESISTOR, fixed: ±10%; 1/8W
R210	6-185C03	82k
R211	6-185B99	47k
R212	6-185B78	820

NOTE: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

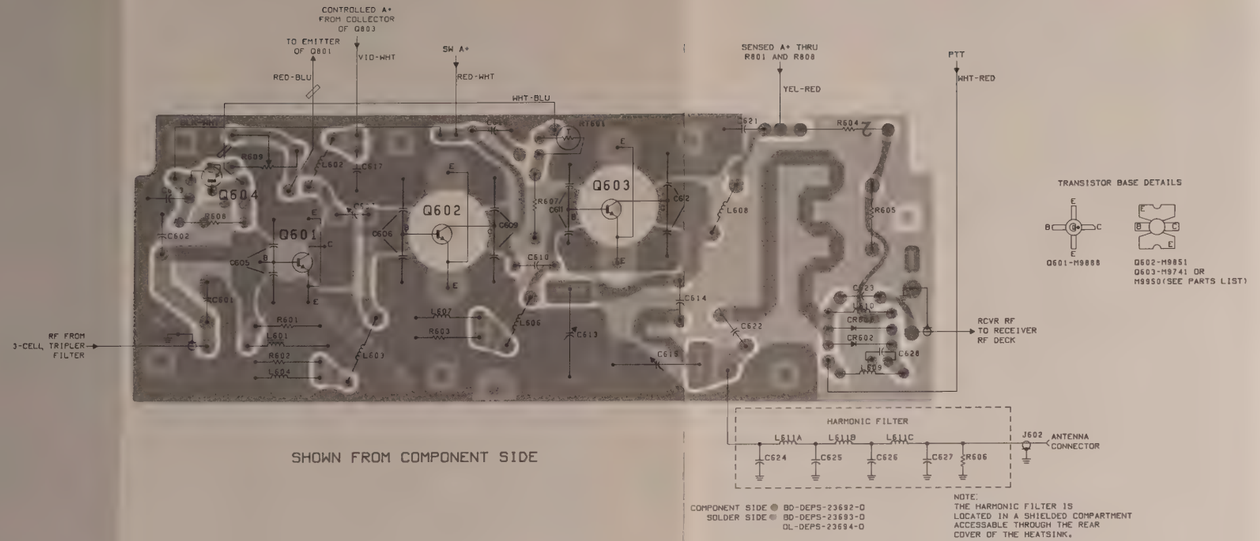


FUNCTION

Amplifies voice signals from the microphone and produces a low-level FM modulated rf signal for the rf power amplifier.

30/25 WATT RF POWER AMPLIFIER HARMONIC FILTER, AND ANTENNA SWITCH

MODELS TLE1833A (450-470 MHz — 30 WATTS)
TLE1834A (470-494 MHz — 25 WATTS)
TLE1835A (494)512 MHz — 25 WATTS)



SHOWN FROM COMPONENT SIDE

TRANSISTOR BASE DETAILS

COMPONENT SIDE @ 80-DEPS-23692-O
SOLDER SIDE @ 80-DEPS-23693-O
OL-DEPS-23694-O

NOTE:
THE HARMONIC FILTER IS LOCATED IN A SHIELDED COMPARTMENT ACCESSABLE THROUGH THE REAR COVER OF THE HEATSINK.

68P81034E87-O
(Sheet 1 of 2)
3/18/77-VG

PARTS LIST

TLE8973A Power Amplifier Board (450-470 MHz)
TLE8974A Power Amplifier Board (470-494 MHz)
TLE8975A Power Amplifier Board (494-512 MHz)

LEGEND

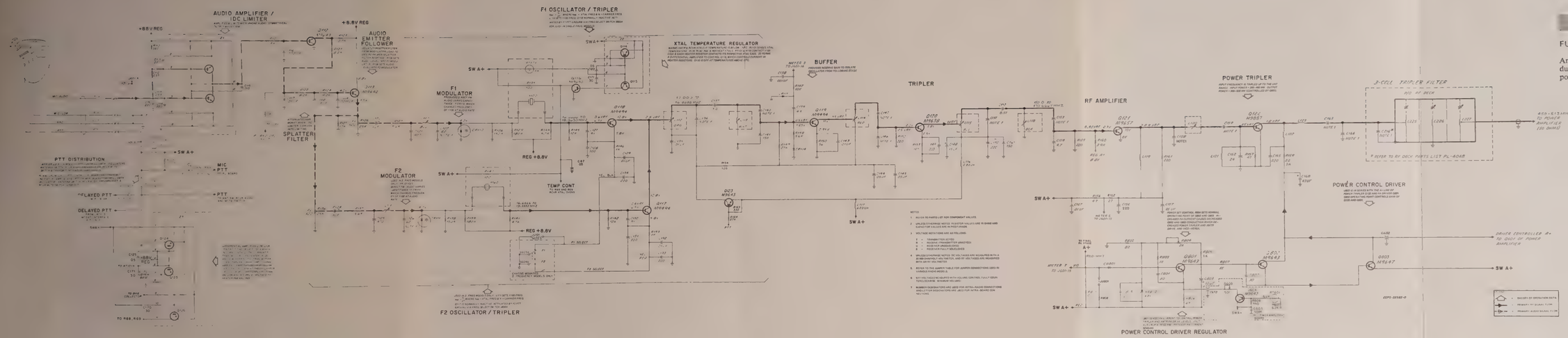
L = 450-470 MHz
M = 470-494 MHz
H = 494-512 MHz

PL-5387-O

NOTE:
This parts list covers three models of the Power Amplifier Board. Where differences exist a letter code is added to the reference symbol to indicate the applicable frequency range.

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, fixed: pF ±5%; 500V unless otherwise stated
C601	21-83406D54	4
C602L	21-83406D95	14
C602M	21-83406D90	11
C602H	21-83406D89	10 ±0.5pF
C603	21-83406D77	30
C604		not used
C607	20-84882C03	variable: 6.6-19.8; 63 V
C608		not used
C610L	21-83740D05	12
C610M,H	21-83740D04	10 ±0.5pF
C613	20-83201B11	variable: 1.5-18; 100V
C614	21-83406D87	43
C615	20-83201B11	variable: 1.5-18; 100V
C616	23-82601A31	15 uF -10 +150%; 25V
C617	21-82372C10	.05uF ±20%; 25V
C618		not used
C619	21-82372C10	.05uF ±20%; 25V
C620	23-8260A31	15uF -10 +150%; 25V
C621	21-82428B08	.02uF -40 +10%; 100V
C622	21-84494B38	15; 500V
C623	21-82428B04	.01uF -30 +70%; 100V
C628L	21-82877846	18 ±10%; 75V
C628M	21-82358C75	15.5 ±2%; 25V
C628H	21-82358C78	14.3 ±2%; 25V
CR601,602	48-83510F05	DIODE: (See Note) silicon
		COIL, rf:
L601	24-83961B01	3 turns, coded brown
L602	24-83884G03	1 1/2 turns, coded brown
L603	24-83961B01	3 trns, coded brown
L604	24-82723H05	0.41 uH, coded yellow
L605		part of circuit board plating
L606	24-83884G03	1 1/2 turns, coded brown
L607	24-82723H05	0.41 uH, coded yellow
L608	24-83884G03	1 1/2 turns, coded brown
L609, 610	24-82723H01	1.2 uH
L611	42-84438K02	fixed wire loop
Q604	48-869643	TRANSISTOR: (See Note) PNP; type M9643
		RESISTOR, fixed: ±5%; 1/4W unless otherwise stated
R601	6-124A07	18
R602	6-124A01	10
R603	6-124D55	2.7 ±10%
R604	6-125C47	820 ±10%; 1/2 W
R605	6-124C59	2.7k ±10%
R607	6-124A68	6.2k
R608	6-124A39	390
R609	18-84944C04	variable: 500±20%; 0.1W

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		NON-REFERENCED ITEMS
	1-80785B95	CABLE ASSEMBLY, receiver includes:
	30-859004	CABLE, coaxial; 6.88" long
	37-82603D60	SLEEVE, numbered: blank
	42-82999L01	CLIP; .407" long
	1-80786B98	CABLE ASSEMBLY includes:
	30-859004	CABLE, coaxial; 9.63" long
	42-82999L01	CLIP; .407" long



FUNCTION

Amplifies voice signals from the microphone and produces a low-level FM modulated rf signal for the rf power amplifier.

		CAPACITOR, fixed: uF ±10%; 100 V; unless otherwise stated
C401, 412, 427	21-82372C01	0.1 +80-20%; 25 V
C402, 403, 405, 430	21-82428B59	.01 +80-20%; 200 V
C404	21-82428B23	.0012
C406, 411, 413, 414, 420, 422, 433, 437	21-83596E10	220 pF ±20%; 500 V
C407, 408, 410, 416, 421, 428, 436	23-84665F01	10 +100-0%; 25 V
C409, 418, 419	21-82428B09	.0047
C415	8-82096J20	0.22; 250 V
C417, 429, 431	23-84665F04	1 +150-0%; 50 V
C423, 424, 426, 435	8-84496D04	.047 ±20%; 100 V
C425	8-82905G31	0.15; 50 V
C434	8-83813H01	.0068
C438	8-82096J20	0.22; 250 V
C439	21-82428B28	.002
C440	23-84665F04	1.0 +150-0%; 50 V
		DIODE: (SEE NOTE)
CR401		NOT USED
CR402, 405, 407, 408, 409	48-83654H01	silicon
CR404	48-82178A06	germanium
		COIL:
L401	25-82498H02	6 H
		TRANSISTOR: (SEE NOTE)
Q401, 402, 408	48-134667	NPN; type M54
Q403 thru 406, 409	48-869642	NPN; type M9642
Q407	48-869643	PNP; type M9643
		RESISTOR, fixed: ±10%; 1/4 W; unless otherwise stated
R401, 402, 406, 440	6-124D02	150k
R403, 404, 405, 407, 411, 417	6-124A99	120k ±5%
R408, 428, 447	6-124C49	1k
R409	6-124C69	6.8k
R410	6-124C63	3.9k
R412, 418, 446	6-124C85	33k
R413, 419	6-124C55	1.8k
R414, 420	6-124C37	330
R415	6-124C93	68k
R416	6-124C65	4.7k
R421, 435	6-124C87	22k
R424	6-124C67	5.6k
R425	6-124C83	27k
R426, 438, 443, 444	6-124C73	10k
R427	6-124C79	18k
R429	6-124C83	27k
R430	6-124C33	220
R431	6-124C61	3.3k
R432	6-124C57	2.2k
R433	18-84944C02	variable; 25k
R434	6-124C53	1.5k
R436	6-124C45	680
R437, 442, 448	6-124C97	100k
R441	6-124C89	47k
R445	6-124C77	15k
R449	6-124C73	10k
		THERMISTOR:
RT401	6-82990E18	190 ohms
		INTEGRATED CIRCUIT: (SEE NOTE)
U401	51-84267A04	type 67A04
		DIODE: (SEE NOTE)
VR401	48-82256C25	Zener type; 12 V

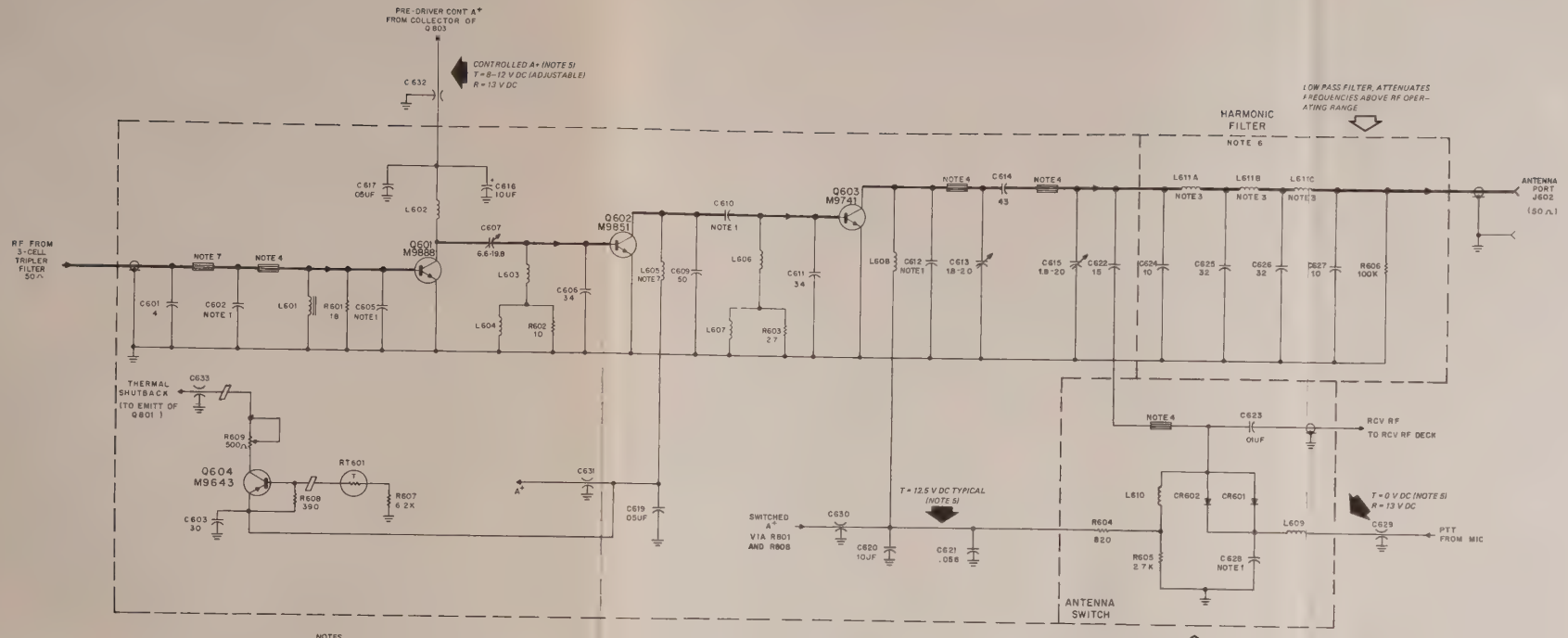
NON-REFERENCED ITEMS

	TLN6709B	"VIBRASPONDER", resonant reed
	42-84116B02	SOCKET, "Vibrasponder"
	39-10184A10	CONTACT, push-pin; male
	39-10184A24	CONTACT, push-pin; female; 9 req'd.
	29-84706E06	PIN, female; molex

NOTE: For optimum performance, replacement diodes, transistors, and integrated circuits must be ordered by Motorola part number.

30/25 - WATT RF POWER AMPLIFIER HARMONIC FILTER, AND ANTENNA SWITCH

MODELS TLE 1833A (450-470 MHz — 30 WATTS)
TLE 1834A (470-494 MHz — 25 WATTS)
TLE 1835A (495-512 MHz — 25 WATTS)



NOTES

1. VALUE DEPENDS ON FREQUENCY BAND. REFER TO PARTS LIST FOR VALUE
2. UNLESS OTHERWISE STATED, RESISTOR VALUES ARE IN OHMS AND CAPACITOR VALUES ARE IN PICOFARADS.
3. INDUCTORS L611 ARE WIRES.
4. 50 OHM MICROSTRIP TRANSMISSION LINE.
5. THESE VOLTAGES ARE MEASURED WITH A+ 13.6 V DC.
6. THE HARMONIC FILTER COMPONENTS ARE MOUNTED IN A SHIELDED COMPARTMENT BETWEEN THE HEATSINK AND THE BACKPLATE COVER OF THE HEATSINK.
7. DISTRIBUTED ELEMENT, PART OF CIRCUIT BOARD PLATING.

LEGEND

- THEORY NOTE
- MAINTENANCE NOTE
- PRIMARY SIGNAL FLOW

ANTENNA SWITCH ISOLATES RCVR INPUT DURING TRANSMISSION THE 50 OHM MICROSTRIP LINE IS A 1/4 WAVELENGTH SECTION.

RECEIVE: PTT UNGROUNDED. CR601, 602 NON-CONDUCTING (OPEN CIRCUIT). 1/4 WAVE LINE Z = 50 OHMS. PA OUTPUT CIRCUIT IS HIGH IMPEDANCE TO RECEIVED RF. RF PASSES TO RCVR RF INPUT

TRANSMIT: PTT GROUNDED. CR601, 602 CONDUCT SHORT AT 1/4 WAVE LINE OUTPUT CAUSES "OPEN" AT LINE INPUT. XMTR RF IS BLOCKED FROM RCVR RF INPUT

DEPS-22969-0

FUNCTION

Provides a filtered 30-watt (25 watt for 470-512 MHz band) frequency-modulated rf signal to the antenna; the antenna switch switches the antenna between the transmitter and the receiver.

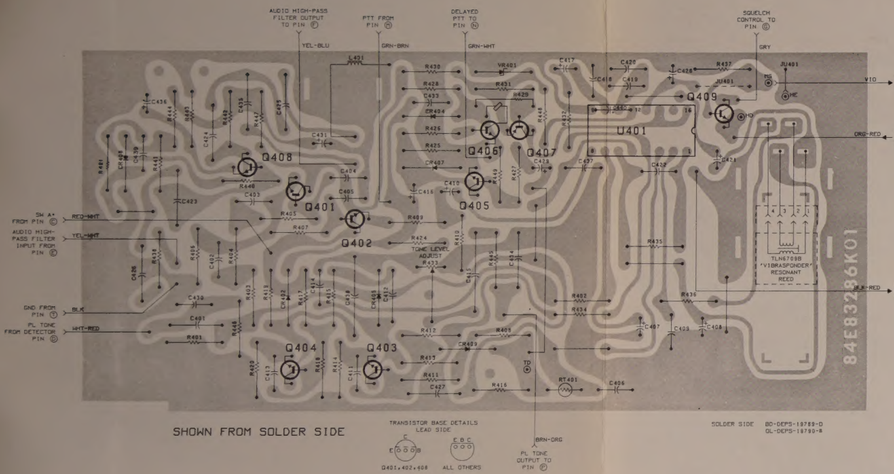
68P81034E87-0
(Sheet 2 of 2)
3/18/77-VG

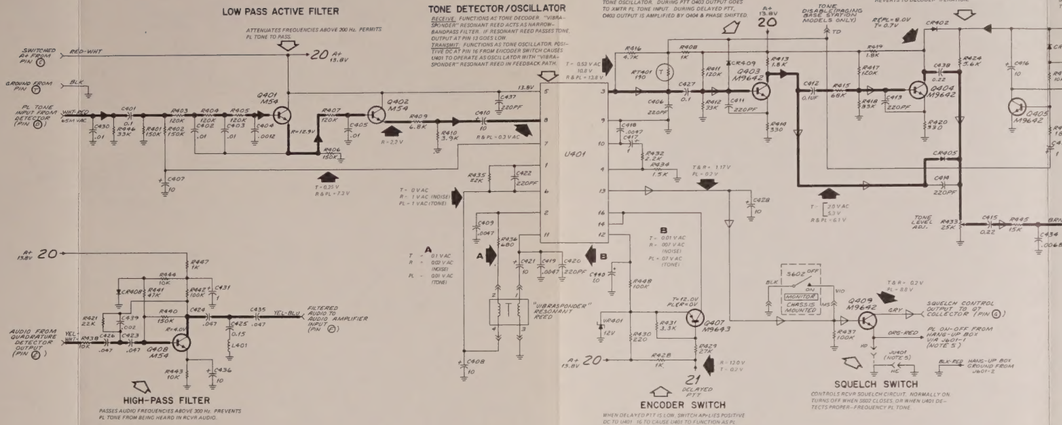
TONE "PRIVATE-LINE" ENCODER/DECODER

MODEL TRN6177B

FUNCTION -

Encodes and decodes sub-audible "Private-Line" tones. Encoder modulates transmitter and delays transmitter turn-off 150 mS to allow transmission of turn-off reverse tone burst. Decoder detects received tone and unsquelches receiver when proper tone is received.




LOW PASS ACTIVE FILTER
ATTENUATES FREQUENCIES ABOVE 300 Hz, PERMITS PL TONE TO PASS.
TONE DETECTOR/OSCILLATOR
RECEIVE: FUNCTIONS AS TONE DECODER. "VIBRASPONDER" RESONANT REED ACTS AS NARROW-BANDPASS FILTER. IF RESONANT REED PASSES TONE, OUTPUT AT PIN 13 GOES LOW.
TRANSMIT: FUNCTIONS AS TONE OSCILLATOR. POSITIVE DC AT PIN 16 FROM ENCODER SWITCH CAUSES U401 TO OPERATE AS OSCILLATOR WITH "VIBRASPONDER" RESONANT REED IN FEEDBACK PATH.
TONE AMPLIFIER
WHEN DELAYED PTT IS LOW, U401 FUNCTIONS AS TONE OSCILLATOR. DURING PTT Q403 OUTPUT GOES TO SWITCH PL TONE INPUT. DURING DELAYED PTT, Q402 OUTPUT IS AMPLIFIED BY Q406 & PHASE SHIFTED.
REVERSE BURST AMPLIFIER
PREVENTS SQUELCH TAIL IN PL OPERATION
PTT UNGROUNDED: Q406 ON, NO TONE PRESENT BECAUSE U401 FUNCTIONS AS DECODER.
PTT GROUNDED: Q406 DISABLED BY GROUND THROUGH CR402. CR405 FORWARD BIASED. PL TONE FROM Q402 PASSES THROUGH CR405 & FOLLOWING COMPONENTS TO PL TONE INPUT OF XMTR.
PTT DELAY: PTT UNGROUNDED. Q406 ON. CR405 REVERSE BIASED. DELAYED PTT IS LOW SO XMTR REMAINS KEYED & U401 PRODUCES PL TONE. PL TONE FROM Q402 IS BLOCKED FROM XMTR BY CR405. PL TONE TO XMTR FROM Q406 IS 2MHT OUT OF PHASE WITH TONE FROM Q402, AFTER ABOUT 150 mS DELAYED PTT GOES HIGH, XMTR UNKEYS, AND U401 REVERTS TO DECODER OPERATION.
PTT DELAY CIRCUIT
PTT UNGROUNDED: DELAYED PTT HIGH. Q405 OFF. Q406 ON. C416 CHARGED TO A+. U401 FUNCTIONS AS TONE DECODER.
PTT GROUNDED: DELAYED PTT LOW THROUGH CR406. Q406 OFF. Q405 TURNS OFF AFTER C405 CHARGES. C416 DISCHARGES THROUGH PTT & CR407. ENCODER SWITCH TURNS ON AND CAUSES U401 TO FUNCTION AS TONE OSCILLATOR.
PTT DELAY: PTT UNGROUNDED: Q405 OFF. Q406 TURNS ON,KEEPING DELAYED PTT LOW. C416 DISCHARGES THROUGH R426 & D426 (5-6 JUNCTION). AFTER ABOUT 150 mS, C416 CHARGES ENOUGH TO TURN Q406 OFF, TURNING Q405 ON. Q405 THEN TURNS ON, PULLING DAHB BASE LOW. Q406 TURNS OFF, DELAYED PTT LINE GOES HIGH AND U401 RESUMES TONE DECODER FUNCTION.
SQUELCH SWITCH
CONTROLS RCVR SQUELCH CIRCUIT. NORMALLY ON. TURNS OFF WHEN 2600 CLOSES, OR WHEN U401 DETECTS PROPER-FREQUENCY PL TONE.
ENCODER SWITCH
WHEN DELAYED PTT IS LOW, SWITCH APPLIES POSITIVE DC TO U401 TO CAUSE U401 TO FUNCTION AS PL TONE OSCILLATOR.
HIGH-PASS FILTER
PASSES AUDIO FREQUENCIES ABOVE 300 Hz. PREVENTS PL TONE FROM BEING HEARD IN RCVR AUDIO.
VERSION CHART
MODEL NO. | VERSION
TRN6177B | 2
NOTES:
1. UNLESS OTHERWISE NOTED, RESISTOR VALUES ARE IN OHMS AND CAPACITOR VALUES ARE IN MICROFARADS.
2. VOLTAGE NOTATIONS ARE AS FOLLOWS.
T = TRANSMITTER KEYED
R = RECEIVE, NO TONE PRESENT
PL = RECEIVE, TONE PRESENT
3. ALL DC VOLTAGES MEASURED WITH 20,000 OHM-PER-VOLT METER UNLESS OTHERWISE NOTED.
4. ALL AC VOLTAGES ARE RMS VALUES.
5. CONNECT JUMP1 TO PIN H6 WHEN HANG-UP BOX IS USED. CONNECT JUMP1 TO PIN H3 WHEN HANG-UP BOX IS NOT USED.
LEGEND:
= THEORY OF OPERATION DATA
= MAINTENANCE DATA
= RECEIVE SIGNAL
= TRANSMIT SIGNAL
= PTT CONTROL SIGNAL
= SQUELCH CONTROL SIGNAL
EEP3-17210-1

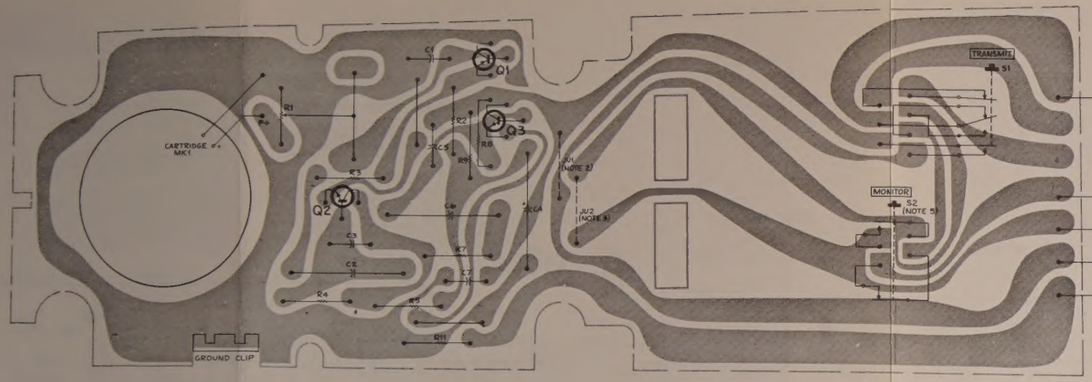
TONE "PRIVATE-LINE" ENCODER & DECODER/DESK MICROPHONES

DESK MICROPHONES

MODELS TMN1008A AND TMN1009A

FUNCTION --

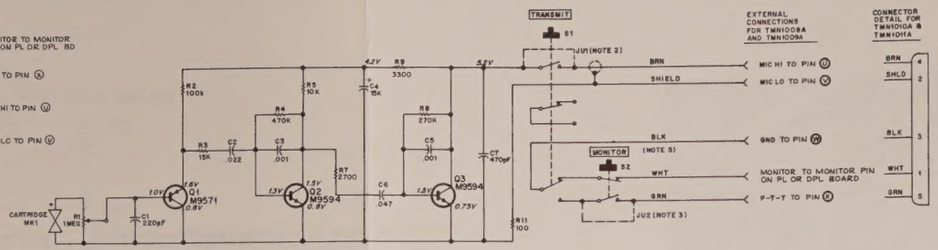
The desk microphones provide a desk surface self-supporting stand to mount the PTT and PL monitor switches and to support the dynamic cartioid microphone element at mouth level. The TMN1008A is used in "Private-Line" squelch systems and provides both PTT and monitor switches; the TMN1009A is used carrier squelch systems and uses only the PTT switch.



E B C

TRANSISTOR DETAIL

SHOWN FROM COMPONENT SIDE



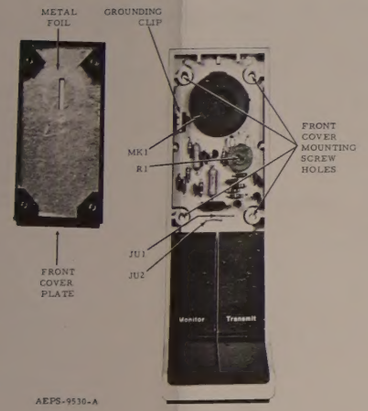
NOTES:

1. UNLESS OTHERWISE STATED: ALL CAPACITOR VALUES ARE IN MICROFARADS.
2. REMOVE JU1 FOR PARALLEL MIC OPERATION.
3. REMOVE JU2 FOR TO MONITOR BEFORE TRANSMIT.
4. ALL DC VOLTAGE READINGS ARE WITH RESPECT TO THE MIC LO LEAD.
5. MONITOR SWITCH S2 IS PRESENT IN MODEL TMN1008A & TMN1010A ONLY.

CEPS-17648-B

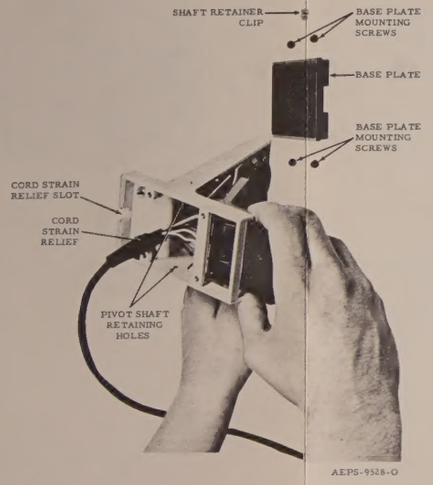
DESK MICROPHONE MODEL COMPLEMENT

TMN1008A	TMN1009A	TMN1010A	TMN1011A	DESCRIPTION	VERSION
	1		1	TLN4925A MICROPHONE CIRCUIT BOARD	2
		1		TRN6029A MICROPHONE CIRCUIT BOARD	0
1				THN6252A MICROPHONE HOUSING AND HARDWARE KIT	0
1				THN6253A MICROPHONE HOUSING AND HARDWARE KIT	0
		1		THN6254A MICROPHONE HOUSING AND HARDWARE KIT	0
	1		1	THN6255A MICROPHONE HOUSING AND HARDWARE KIT	0



AEPS-9530-A

80-DEPS-18651-O
OL-DEPS-17641-A



AEPS-9528-O

MICROPHONE DISASSEMBLY DETAIL

PARTS LIST

TRN6029A & TLN4925A Microphone Circuit Board PL-3510-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, fixed: uF ±10%
C1	21-82187B08	220 pF; 500 V
C2	8-82987E11	.022; 80 V
C3	21-82187B44	.001; 100 V
C4	23-84762H09	15; ±20%; 20 V
C5	21-82187B44	.001; 100 V
C6	8-82987E02	.047; 200 V
C7	21-82187B45	470 pF; 500 V
MK1	59-84640E01	CARTRIDGE, microphone: miniature
		TRANSISTOR: (SEE NOTE)
Q1	48-869571	PNP; type M9571
Q2, 3	48-869594	NPN; type M9594
		RESISTOR, fixed: ±10%; 1/4 W; unl. stated
R1	18-83083G34	variable; 1.5 meg ±30%
R2	6-129226	100k
R3	6-127805	15k
R4	6-124B14	470k ±5%
R5	6-129668	10k ±5%
R7	6-129707	2.7k ±5%
R8	6-131858	270k ±5%
R9	6-129231	3.3k
R11	6-129753	100
NON-REFERENCED ITEMS		
	5-84371E01	GROMMET, cartridge
	42-84724E01	CLIP, grounding

THN6252A (PL) & THN6253A (Carrier Squelch) Microphone Housing & Hardware Kit PL-3511-B

S1, 2	40-84711E02	SWITCH, leaf: assembly: S1 has 1 form A, 1 form B and 1 form C; S2 has 1 form A and 1 form B (THN6252A)
S1	40-84711E03	assembly: includes 1 form A, 1 form B and 1 form C (THN6253A)
NON-REFERENCED ITEMS		
	3-136676	SCREW, switch mtg. 4-40 x 1/4 pnl hex
	1-80780B29	CABLE ASSEMBLY includes: 39-10184A24 LUGS; 5 req'd.
	15-84186E01	COVER, front
	15-84188E01	COVER, rear
	15-84191E01	HOUSING
	26-84720E01	FOIL, grounding, front cover
	26-84721E01	FOIL, grounding, rear cover
	38-84184E02	BUTTON, plain (THN6253A)
	38-84184E01	BUTTON, "monitor" (THN6252A)
	38-84192E01	BUTTON, "transmit"
	42-84725E01	CLIP, shaft retainer
	47-84193E01	SHAFT, pivot
	47-84194E01	SHAFT EXTENSION
	47-84723E01	SHAFT COUPLING (THN6252A only)
	22-82591C05	PIN, roll (THN6252A only)
	64-84183E01	PLATE, base
	75-84722E01	PAD, base plate
	3-138809	BASE PLATE SCREW 4-40 x 5/16 phl bn hx bk ox
	3-138810	FRONT COVER SCREW 4-40 x 5/8 phl bn hx bk ox
	4-10058B10	WASHER ("TEFLON")

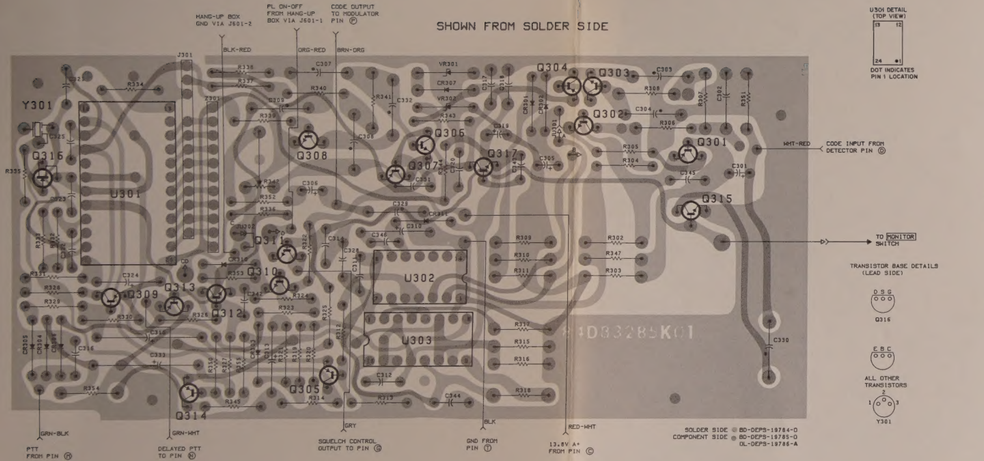
NOTE: Replacement transistors must be ordered by Motorola part number only for optimum performance.

"DIGITAL PRIVATE-LINE" ENCODER/DECODER

MODEL TRN6207A

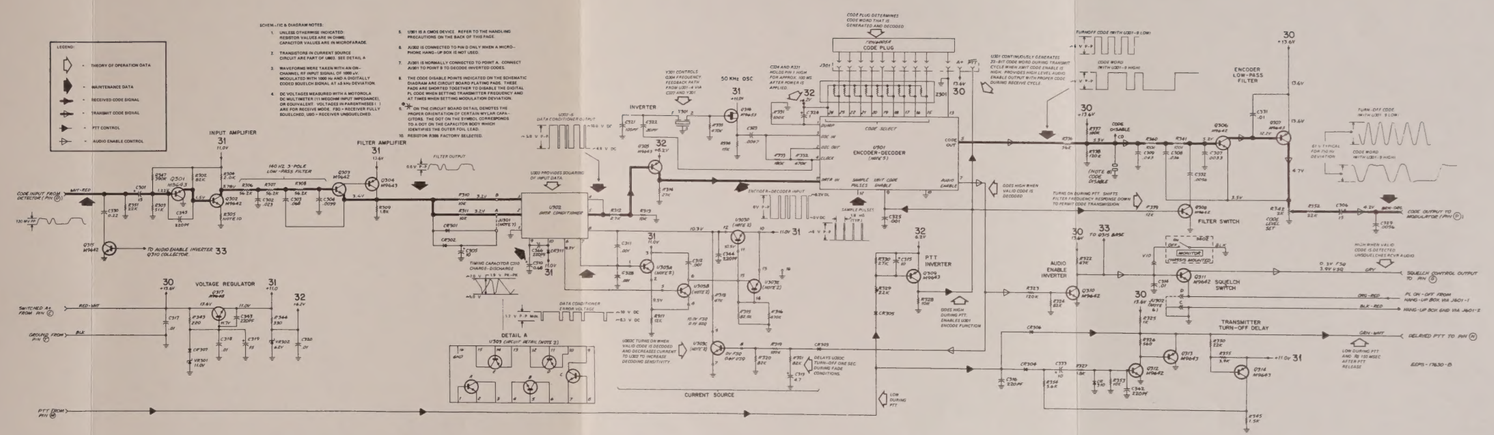
FUNCTION --

Encodes and decodes "Digital Private-Line" codes. Encoder modulates transmitter and delays transmitter turn-off 150 mS to allow transmission of turn-off code. Decoder detects received tone and unsquelches receiver when proper code is received.



U301 DETAIL (TOP VIEW)

DOT INDICATES PIN 1 LOCATION


LEGEND:
THEORY OF OPERATION DATA
MAINTENANCE DATA
RECEIVED CODE SIGNAL
TRANSMIT CODE SIGNAL
PTT CONTROL
AUDIO ENABLE CONTROL
SCHEMATIC DIAGRAM NOTES:
1. UNLESS OTHERWISE INDICATED: RESISTANCE VALUES ARE IN OHMS; CAPACITOR VALUES ARE IN MICROFARADS.
2. TRANSISTOR IN CURRENT SOURCE CIRCUIT ARE PART OF U802. SEE DETAIL A
3. WAVEFORMS WERE TAKEN WITH AN ON-CHANNEL, 60 INPUT SIGNAL (1 KHZ SINEWAVE FOR TX, AND 1 KHZ DIGITALLY CODED SQUELCH SIGNAL AT 4.5 KHz DEVIATION.
4. DC VOLTAGES MEASURED WITH A MOTOROLA DC MULTIMETER (1 MEGOHM INPUT IMPEDANCE) OR EQUIVALENT. VOLTAGES IN PARENTHESES ( ) ARE FOR RECEIVE MODE. FSQ = RECEIVER FULLY SQUELCHED, UNSQ = RECEIVER UNSQUELCHED.
5. U301 IS A CMOS DEVICE. REFER TO THE HANDLING PRECAUTIONS ON THE BACK OF THIS PAGE.
6. AUX2 IS CONNECTED TO PIN 5 ONLY WHEN A MICROPHONE HANG-UP BOX IS NOT USED.
7. AUX1 IS NORMALLY CONNECTED TO POINT A. CONNECT AUX1 TO POINT B TO DECODE INVERTED CODES.
8. THE CODE ENABLE POINTS INDICATED ON THE SCHEMATIC DIAGRAM ARE CIRCUIT BOARD PLATING PADS. THESE PADS ARE SHORTED TOGETHER TO ENABLE THE DIGITAL CODE. THE CODE IS DISABLED WHEN THE PADS ARE OPEN AT TIMES WHEN SETTING MODULATION DEVIATION.
9. ON THE CIRCUIT BOARD DETAIL DENOTES THE PROPER ORIENTATION OF CERTAIN MYLAR CAPACITORS. THE DOT ON THE SYMBOL CORRESPONDS TO A DOT ON THE CAPACITOR BODY WHICH IDENTIFIES THE OUTER FOIL LEAD.
10. RESISTOR R388 FACTORY SELECTED.
CODE PLUG DETERMINES CODE WORD THAT IS GENERATED AND DECODED
PROGRAMMABLE CODE PLUG
U301 CONTINUOUSLY GENERATES 23-BIT CODE WORD DURING TRANSMIT CYCLE WHEN UNIT CODE ENABLE IS GROUNDED. CODE WORD INVERTED DURING RECEIVE CYCLE.
CODE WORD WITH U301-9 HIGH
TURNOFF CODE WITH U301-9 LOW
TURNS ON DURING PTT. SHIFTS FILTER FREQUENCY RESPONSE DOWN FOR TRANSMISSION.
U301 CONTROLS LOW FREQUENCY FEEDBACK PATH FROM U301-9 VIA CONNECTOR
50 KHz OSC
CCW AND R321 INCREASE LOOP GAIN FOR APPROX 100 MS AFTER POWER IS APPLIED
U301 DATA CONDITIONING ONLY
INVERTER
ENCODER-DECODER (MPU 7)
CODE SELECT
CODE ENABLE
AUDIO ENABLE (INVERTED)
SAMPLE PULSES
SAMPLE PULSE DISABLE
U301 CODE OUT
U301 AUDIO OUT
U301 CODE ENABLE
U301 AUDIO ENABLE
U301 PTT INVERTER
U301 PTT
U301 SAMPLE PULSES
U301 SAMPLE PULSE DISABLE
U301 CODE ENABLE
U301 AUDIO ENABLE
U301 CODE OUT
U301 AUDIO OUT
U301 PTT
U301 PTT INVERTER